APRIL 26, 1954

NEWS ISSUE

Electrical World

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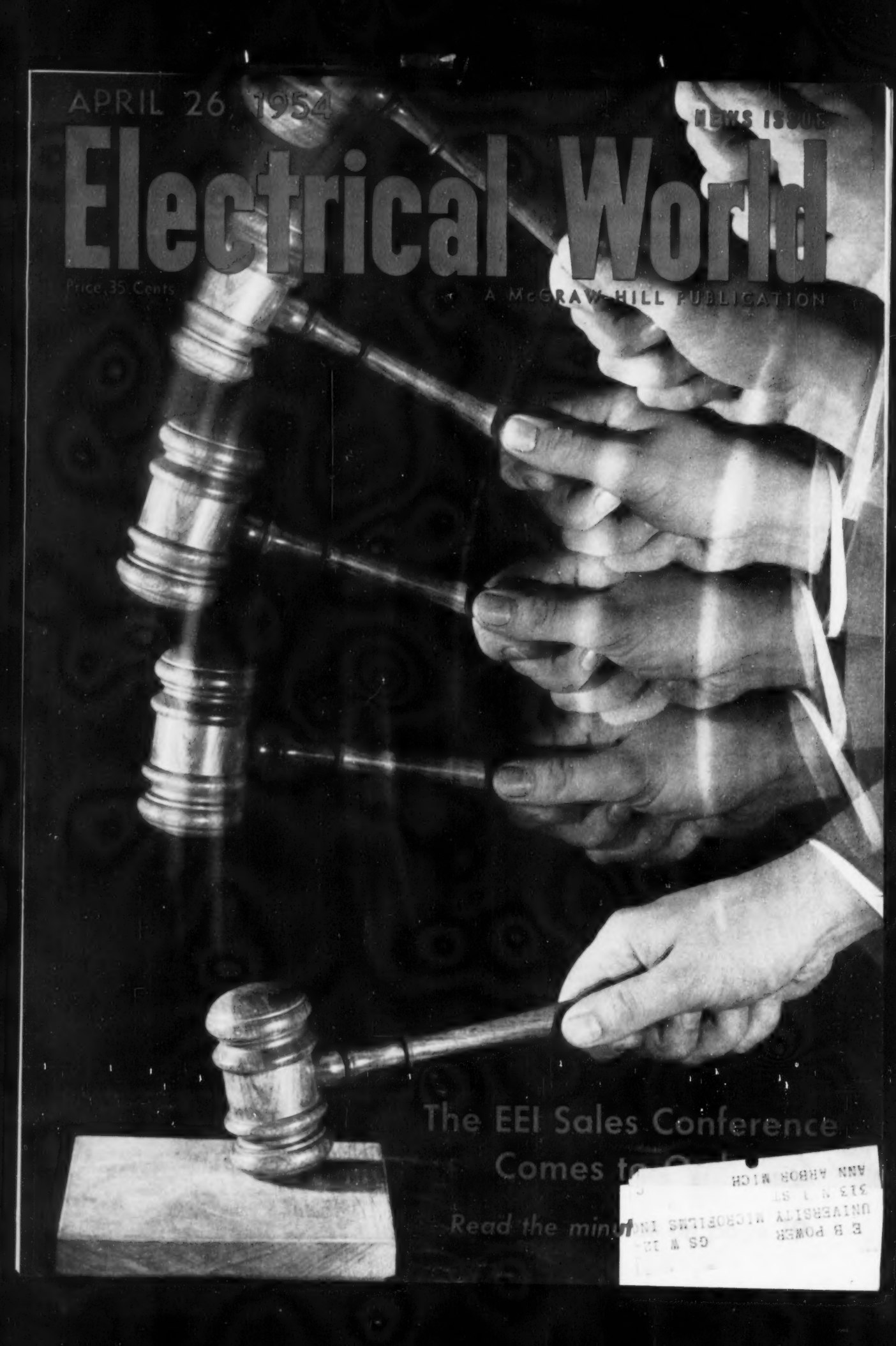

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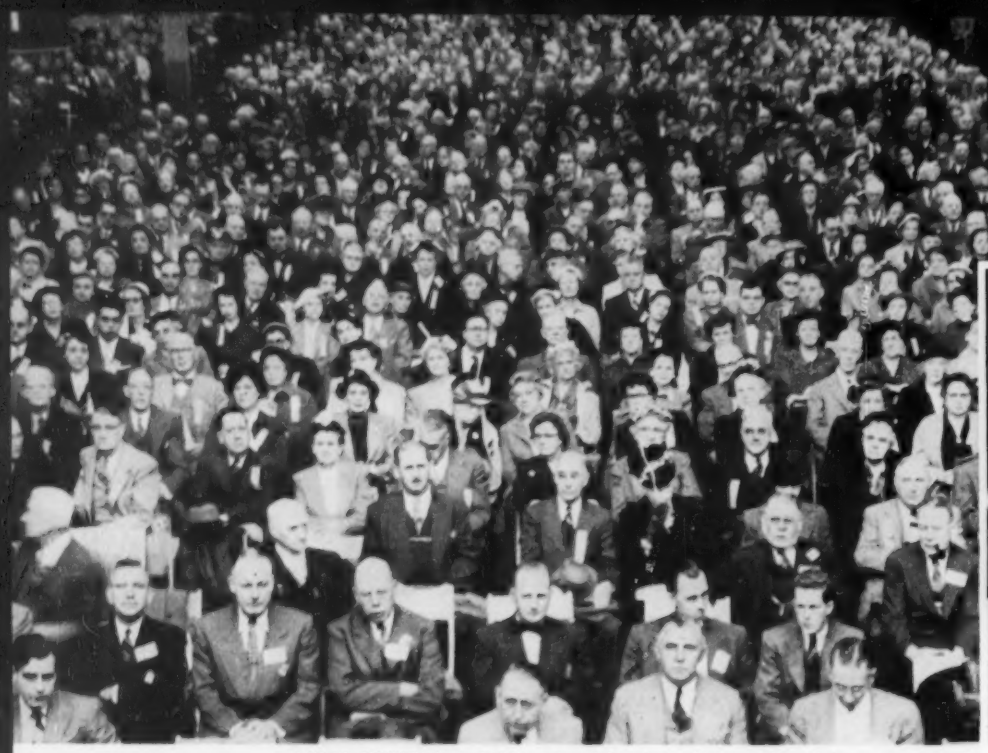
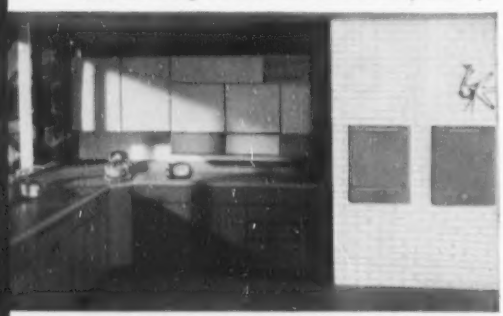


SHARE OWNERS hear G-E President Ralph J. Cordiner re-affirm their company's confidence in the future — both in the economy as a whole and in the electrical manufacturing industry in particular.

24% more for G-E expansion in 1954 underscores confidence in expanding economy

ALL-ELECTRIC HOME shown to G-E share owners as example of "be modern — live electrically" which will build increasing loads for the electric utility industry.



NEW THIN-WALL INSULATION for overhead cabinet refrigerator and two wall ovens demonstrate results of GE's large investments for research and development.

Electrical industry invests 3 times as much money in research and development as other businesses, share owners told last week

"More new businesses and products have been launched by General Electric in the post-war decade than in the preceding 30 years," President Ralph J. Cordiner declared at the company's annual share owners' meeting.

To continue this far-sighted program and assist in the sale of more electrical equipment with resulting increases in sales for electric utilities, G-E will spend $175,000,000 in 1954, 24% more than last year, to modernize its plant and equipment facilities. This expenditure to produce more and better products will be the highest in the company's history.

UTILITY EXPANSION ENCOURAGED

Indicative of the electrical industry's progress, Mr. Cordiner emphasized that the industry as a whole invests 6% of its gross sales volume for research and development — substantially above the 2% which is the average spent by the rest of U. S. industry.

The fields of research in which G-E is engaged today offer many possibilities for new and improved products which will provide more and better jobs throughout industry. New electrical appliances, for example, help improve our living standards and "also make a further contribution by their dynamic effect on our economy, keeping it healthy and growing," said Mr. Cordiner. Products such as color television, clothes dryers, air conditioning units, heat pumps and the like continue to encourage electric utility expansion for constantly increasing loads.

ALL-ELECTRIC HOME FEATURED

To illustrate visually this increasing demand a typical all-electric home was featured at the share owners' meeting. Its devices for comfort and convenience require almost 10 times today's average energy consumption of 2,175 kwhr. This house is typical of many all-electric homes being built all over the country. General Electric Company, Schenectady 5, N. Y. 301-264

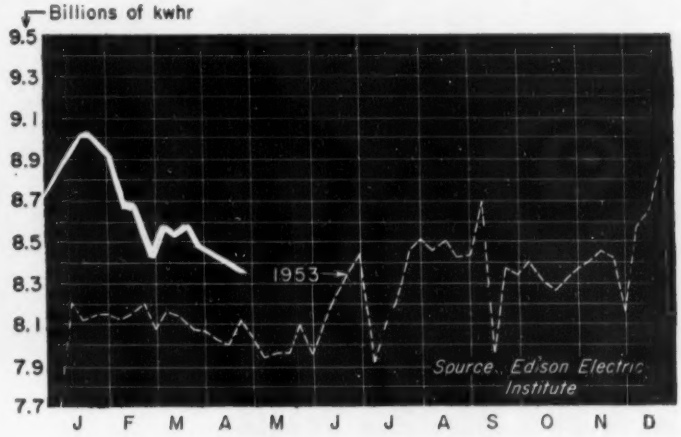
MORE POWER TO AMERICA

GENERAL ELECTRIC

VOLUME 141, NO. 17

April 26, 1954

Electrical World



Output Week Ended April 17—8,345,000,000 Kwhr

Seasonally Adjusted Index†—164.6

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	Cent. West	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Apr. 17	+2.9	−1.1	−1.4	−5.7	+6.1	+16.2	+12.9	+4.9	+3.9	−1.6
Apr. 10	+4.9	+3.0	+2.8	−2.2	+8.3	+18.6	+11.2	+2.8	+6.7	−5.4
Apr. 3	+5.5	+3.9	+2.2	−1.8	+10.7	+19.9	+8.7	+4.5	+8.7	−3.6

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Feb.	78.0	81.1	73.7
Capacity (Million Kw)	Feb.	92.46	91.68	82.83
Production (Billion Kwhr)	Feb.	35.21	39.42	33.60
Hydro	Feb.	8.56	8.90	8.99
Fuel	Feb.	26.65	30.52	24.60
Fuel Consumption				
Coal (Million Tons)	Feb.	9.07	10.92	9.16
Oil (Million Barrels)	Feb.	5.70	8.29	6.81
Gas (Billion Cu Ft)	Feb.	75.74	67.41	57.82
Sales (Billion Kwhr)	Jan.	33.45	32.31	32.07
Residential	Jan.	10.96	9.77	9.82
Commercial	Jan.	5.79	5.60	5.37
Industrial	Jan.	14.52	14.83	14.90
Other	Jan.	2.17	2.12	1.97
Net Income Class A & B Companies ($ Million)	Dec.	105.32	84.26	101.50
Estimated Dec. 54 Peak (Million Kw)	Jan.	93.4	94.0	96.1
Kwhr per Residential Customer (12 Month Average)	Jan.	2,363	2,345	2,187
Revenue per Kwhr Residential Service (12 Month Average)	Jan.	2.74¢	2.74¢	2.77¢
Canadian Production (Billion Kwhr)	Jan.	5.63	5.72	5.66

Business Statistics

FRB Industrial Production Index†	Mar.	125*	126**	138
Gross National Production Annual Rate ($ Billion)	1st Qtr	358.5	363.5	363.9
EW 4 Industry Production Index†	Mar.	113.1	115.0**	127.0
ENR Construction Cost Index††	Apr.	129.0	128.7	123.6
BLS Consumer's Price Index	Feb.	115.0	115.2	113.4
NEMA Insulation Materials Sales Index†	Feb.	120	124	177
NEMA Electric Appliance Sales Index†	Feb.	98	90	121
NEMA Household Refrig. Sales Index†	Feb.	91	95	106

*Preliminary **Revised †1947-49=100 ††1949=100

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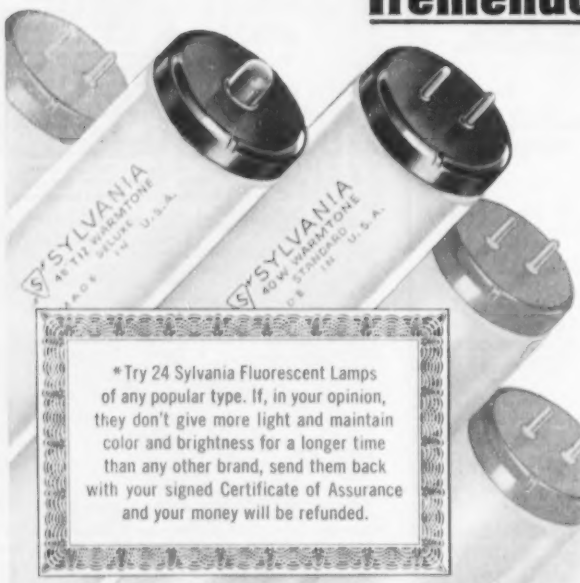
You're always ahead with Sylvania Fluorescent Lamps because of Tremendous Trifles



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LIGHTING · RADIO · ELECTRONICS · TELEVISION

THE ELECTRICAL WEEK

The Issue's News Highlights . . . Legislation drafted by Joint Committee on Atomic Energy would permit AEC to grant licenses to utilities for construction and operation of nuclear-fueled power plants.

Representatives of Georgia Power and co-ops in the state meet this week in Washington to discuss distribution of power from Clark Hill project.

At Niagara hearings, union and public power representatives urged passage of a modified Case bill.

The demand for a guaranteed annual wage has now been put to General Electric Co. IUE-CIO, which earlier in the month posed the problem for Westinghouse, suggested GE put 5% of its payroll into a fund to provide a guarantee of 2,080 hours of pay each year. Its left-wing rival, the independent United Electrical Workers, is expected to make a similar demand this week. Initial reaction by the company was that such plans were impractical. A company spokesman pointed out that GE had tried a guaranteed wage plan at some of its plants in the Thirties, but gave it up when it proved unworkable.

In other labor negotiations, Commonwealth Edison of Chicago signed a new contract with IBEW calling for a 3½% increase in pay. For 13,500 workers covered, this is an average raise of 7.6¢ an hour . . . IBEW and Alabama Power settled for increases amounting to 1.68% of the company's payroll.

Edison Electric Institute plans to develop five themes at the five general sessions of its 22nd annual convention in Atlantic City, June 1-3. The themes: Tribute to Thomas A. Edison, Atmosphere for Development, Looking Ahead, Finance, and Power Marketing—Atomic Energy.

A three-way contract is being negotiated that would keep a Colorado co-op from adding capacity. The co-op, Southeast Colorado Power Association of La Junta, needs an additional 7,500 kw to meet expanding demand. Members were considering whether to ask Rural Electrification Administration for a G&T loan or buy power from Southern Colorado Power Co. Then REA Administrator Ancher Nelsen met with co-op and company officials in La Junta. This tentative arrangement was worked out: Power company would apply for an REA loan to build the 7,500 steam plant, with capacity assigned the co-op.

Pacific Gas & Electric Co is a party to two "partnership" proposals up for consideration by the federal government. The company has offered to construct all power facilities in the proposed multiple-purpose development of the Trinity River. And it has contracted for all power from three dams two irrigation districts want to build on a "partnership" basis on the Stanislaus River.

Off the Washington Wire . . . An attempt is being made to require a withdrawal or recapture clause in all federal power contracts with electric companies so that public groups and co-ops, as "preference customers," can get federally produced power as they need it. National Rural Electric Cooperative Association wants this sort of language in the bill to dispose of power from Falcon Dam, an international project astride the Rio Grande. Effect would be to write Democratic interpretation of preference into permanent law.

Water-flow outlook for most of the West is generally good, but trouble spots are showing up. Looks like another dry year for the Rio Grande Basin and areas in the Southwest, east of the Continental Divide. There are light runoffs in one or two small Northwest Basins.

South Dakota rural co-op men are discussing the possibility of an atomic power plant to firm Missouri Basin hydro power. AEC has no comment.

Hoover Commission task force looking into federal power operations has scheduled public hearings for San Francisco May 3 and Portland, Ore., June 28.

Corps of Army Engineers announced these new district engineer assignments: Col Thomas D. Rogers, Savannah, Ga.; Col Harry O. Fischer, Fort Worth, Tex.; Col Loren W. Olmstead, Buffalo, N. Y.; Col Edward E. Murphy, Milwaukee, Wis.

For the fifth time in five years, Magic Valley Electric Cooperative mailed out patronage refund checks to its more than 5,000 members. This year's refund amounted to $70,812, bringing the five-year total to $350,000.

Ralph E. Marbury, veteran engineer of Westinghouse Electric Corp, received a $5,000 "outstanding invention" award from the company for inventing a way to "detour" excessive current due to lightning on power lines, protecting vital capacitors from damage.

Fredericksburg, Va., councilmen are toying with the idea of a city tax on electric, gas and telephone bills similar to the 10% on gas and electric bills enacted by Waynesboro, Va., City Council.

Taconite production, expected to be a big future user of electric energy, is under way. First 18,000-ton shipment to blast furnaces was made last week.

Executive Changes . . . Harold Quinton, executive vice president of Southern California Edison, was elected president to succeed William C. Mullendore, new board chairman . . . B. B. Neel, secretary-treasurer of Black Hills P&L, was appointed vice president, financial.

Making Way for Atomic Power Industry

• Legislation drafted by Joint Congressional Committee would permit licensing by AEC of private firms and public groups to construct and operate nuclear-fueled power plants

• Some of incentives asked by private companies at previous hearings are included in proposed amendments to McMahon Act

Joint Congressional Committee on Atomic Energy has drafted legislation designed to clear the way for a civilian atomic power industry.

First big step came with the introduction of a 78-page bill which would completely overhaul present atomic energy law to permit private development of atomic power. The bill also would permit the U. S. to exchange atomic weapon information with its allies and to cooperate with other nations in the development of peacetime uses of atomic energy.

Public hearings are scheduled to begin in early May on the extensive amendments proposed by the committee. Following the hearings, the group will again go behind closed doors to work out a final version of the bill for presentation to Congress.

Priority Rating in Congress

The legislation has a priority rating and is slated to reach the House and Senate for debate during the current session. However, any vigorous opposition could sidetrack it for the year because of its late start.

The bill, introduced by Chairman Sterling Cole of the Joint Committee, has more than academic interest for electric companies.

Until the law is changed, AEC has sole authority to construct and operate atomic power plants. Although it has built several experimental models, its first utility-size plant is still in the design stage at Westinghouse Electric Corp in Pittsburgh.

Duquesne Light Co has contracted with AEC to furnish part of the funds and operate this 60,000-kw plant. AEC estimates the Duquesne contribution will save the government $30-million.

In another development announced the day after the committee bill was introduced, the Detroit Edison-Dow Chemical study team told of an advanced program for developing a power reactor. Under AEC auspices, the team with its 26 member companies will put another $2.3 million in research and development on the breeder reactor.

Detroit-Dow Program

The Detroit-Dow program will involve work necessary to complete a basic design for an atomic heat power reactor. Components of the proposed reactor may be built and tested, but the construction of the complete reactor is not included in this phase of the study. Enactment of the committee's proposals would enable the industry team to own and operate the reactor it is now designing.

In commenting on the accord, Detroit Edison Pres Walker Cisler said: "Work under the new agreement will move the project out of the predominantly paper study stage, and further into a stage where actual physical development will be predominant."

Under the committee proposals, Atomic Energy Commission would take on quasi-judicial duties of licensing private firms and public groups to build and operate nuclear power plants. Fissionable material used as fuel would be government property whether originally furnished by the government or produced as an adjunct to power production.

AEC would have authority to either accept or reject applications for licenses.

Applicants would have to satisfy AEC rules and regulations relating to financial and technical qualifications, health and safety precautions, feasibility, and operation of facilities.

However, applicants turned down by AEC could appeal to a three-man review board specially created to rule on disputes arising from the licensing procedure. Provision is also made in the committee proposals for appeal to the federal courts, although court action is ruled out if both AEC and the National Security Council find it would necessarily involve disclosure of restricted information.

In general, the committee proposals include the incentives urged by private industry at previous hearings for development of civilian atomic power. Private firms would be allowed to retain title to plants built for production of nuclear power. They would also be able to secure patents on any new inventions in the field as long as the inventions are not directly related to weapon development.

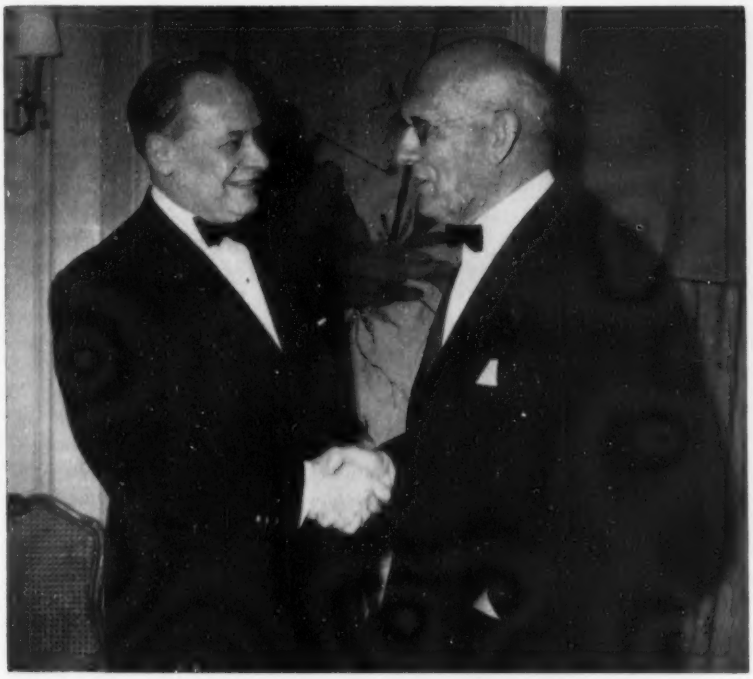
The majority of industry spokesmen at hearings last summer said the title for atomic fuel should be held by the firm which owns the plant. However, several said this was not of major significance. Public power groups strongly endorsed continued government ownership of nuclear fuel.

In case of a national emergency, the government would have authority to withdraw the fuel materials used in nuclear power plants in the interest of defense.

The committee proposals provide for safeguarding any restricted information used to build and operate nuclear power plants. Engineers and designers would have to be given clearances by AEC before gaining access to restricted government-held reactor data.

'Preference Clause' Hinted

There was one hint of a "preference clause" in the committee proposals. This came in a section providing for the disposal of electric power produced as a byproduct of fissionable material manufacture. The present law says such power may be used by the commission or "sold to other government agencies or utilities or users at reasonable prices." The new language reads: "sold to other government agencies or to publicly or privately owned utilities or users at reasonable and nondiscriminatory prices." By placing public utilities ahead of privately owned utilities in the listing, it may be argued that the publics are to get preference.



Sammis Receives Egleston Award

Walter H. Sammis (left), president of Ohio Edison Co and Edison Electric Institute, received congratulations from Charles F. Kettering after being awarded Egleston Medal at Columbia Engineering Alumni Association dinner on April 14. The medal also was presented to Frank A. Ayer, international copper mining consultant.

Egleston Medal is awarded each year for distinguished engineering achievement to alumni of Columbia University schools of engineering.

Sammis received his electrical engineering degree from Columbia in 1917. Later he taught electrical engineering at Columbia. From 1947 to 1953 he served as alumni trustee of the university and currently is a member of the Committee on Investments and is chairman of the National Committee of Sponsors for the projected Engineering Center at Columbia.

Kettering, noted inventor and director of General Motors Corp, was guest speaker at the award dinner. He discussed the difficulties of modern scientific education in supplying properly trained engineers to industry.

Georgia Power Co, Co-ops to Hold Clark Hill Talks

Interior Department has agreed to a meeting in Washington this week with representatives of Georgia electric cooperatives and Georgia Power Co to try to work out an agreement on sale of energy from Clark Hill Dam, Army Corps of Engineers project on the Savannah River.

The co-ops last week turned down an Administration plan for a three-party contract under which Georgia Power would buy from the government and sell to the co-ops. They said it violates federal preference clause provisions.

The co-ops through their counsel, former Gov Ellis Arnall, made several counter proposals. They involved one contract between co-ops government, and Georgia Power, under which the co-ops, would buy the power and the company would wheel it. Another proposal provided for outright purchase of the power by the co-ops. Arrangements for distribution of the power then would be made privately with the company.

Georgia Power and the cooperatives never have met to discuss the Clark Hill dispute and the co-ops insisted a solution might be reached if the two sides sat down together at the conference table.

600,000-Kw Nick . .

. . . in TVA load to be made as outgrowth of Eisenhower suggestion for shift to private suppliers

Atomic Energy Commission is nearing agreement on a proposition which indirectly would shift some 600,000 kw of its electric power demands from Tennessee Valley Authority to private electric companies.

Details of the agreement may be released today at hearings before a Senate Appropriations subcommittee considering TVA funds. It is a reworking of a suggestion by President Eisenhower that a portion of AEC's Paducah plant load be shifted from TVA to private utilities. Stated aim is to free TVA power for use by residents and industries in the TVA area.

A letter from AEC General Manager K. D. Nichols to the Senate subcommittee last week disclosed that negotiations have been under way for several weeks with the Southern Co and Middle South Utilities Co to supply AEC requirements.

New Offer . . . When the private offer to supply Paducah was first made Nichols told a House subcommittee that he was not disposed to release TVA from its commitments (EW, April 5, p 88). Recent reports are that he looks favorably on the revised proposition. It would work like this:

Southern and Middle South would join to build a 600,000-kw steam plant just across the river from Memphis, where TVA has been attempting to get funds for a 450,000-kw plant.

Power and energy from the privately owned plant would be transmitted across the river to the TVA system to serve the Memphis area.

Shift in Loads . . Relieved of the Memphis load, TVA could then serve the AEC load at Paducah, Ky., from its Shawnee Plant, which is now partly in operation. The extra power coming in from the privately owned plant would also enable TVA to meet growing residential and industrial demands in the western part of its system.

The Bureau of the Budget has been supervising government negotiations with the two companies for the past several weeks. It is believed substantial agreement has been reached on rates and cancellation arrangements.

More Backers for Case Bill

Two public power groups, union back measure turning Niagara issue over to FPC if preference clause is inserted

The Senate Public Works Committee is getting plenty of political oratory during its current hearings on legislation authorizing additional power development at Niagara Falls as the feud between conflicting New York State groups continues.

Ask Preference Clause . . . Last week, three more spokesmen urged the committee to reject the House-passed Miller-Capehart (private power development) bill and to adopt a modified version of the bill introduced by Sen Francis P. Case (R-S.D.). The three—Alex Radin, general manager of the American Public Power Association; Ralph Dickinson, president of Municipal Electric Utilities Association of New York; and Elswood Swisher, president of CIO Gas, Coke and Chemical Workers—testified they would support the Case bill if it included a federal-type preference clause.

Similar positions have been taken by the National Farmers Union and the National Rural Electric Cooperative Association (EW, April 5, p 90).

Miller Replies to Moses . . . Perhaps the hottest testimony at the hearing last week, though, was that submitted in writing by Rep William E. Miller (R-N.Y.), co-author with Sen Homer Capehart of the bill authorizing private utilities to develop Niagara power.

Miller was replying to the testimony submitted earlier this month by Robert Moses, recently appointed by Gov Thomas E. Dewey as chairman of New York State Power Authority. Moses lambasted the Miller-Capehart proposal and backed Dewey's position for state (public) development.

Miller said he and other sponsors of private enterprise development have had to "shoot at moving targets" ever since Congressional hearings were reopened last summer to get Dewey's testimony. Having finally answered Dewey's arguments, Miller said he and his associates are now confronted with Moses, "who has covered the record with vilification, abuse and contempt, and dire threats of political disaster and endless litigation."

Miller told the committee in a letter addressed to Chairman Edward Martin (R-PA.) that if Moses' contempt for those who support private power development is justified, then our form of government ought to be changed "so that we can place Mr Moses in a position to dictate to all our misguided people what is in their best interests."

Cites Court Decisions . . . Contrary to the argument presented earlier by Moses, Miller claimed a long line of Supreme Court decisions showed there was no support in constitutional law for New York State's threatened court action if the Miller-Capehart bill is adopted. He cited recent refusal of the Supreme Court to interfere with a hydro license granted by Federal Power Commission for a project in technical violation of state game laws in Washington (EW, April 12, p 7).

Miller said this action, in effect, reaffirmed the decision in the celebrated First Iowa case (that state laws in conflict with lawful terms of a federal license must yield to the federal authority), and leaves no room for interpreting the recent Niagara-Mohawk Power Corp opinion by the court as putting state laws above the power of Congress to determine controversies over water power projects.

Different Interpretation . . . Radin, on behalf of over 700 publicly owned utilities, however, said the Niagara-Mohawk decision meant that the Federal Power Act does not supersede state law and that state rights in a river are paramount. For this reason, he said, the courts would throw out a bill calling for private development of the falls over state objections.

Loading Plants with a Slide Rule

Latest tool in use at Carolina Power & Light Co's Method Substation is equal incremental loading slide rule. The device enables dispatchers to load various steam units on system so that load can be carried at minimum cost. By adjusting the indicator for any given total load to be carried on all steam units, the dispatcher can tell how much load should be carried on each unit for the minimum overall cost at all plants.

Seated in front of the instrument is Dispatcher George Tackett. Standing are (left to right) Ott Jones, superintendent of Wilmington Steam Plant and designer of the slide rule; Chief Dispatcher O. A. Palmer; and Jimmie Bass, who constructed and assembled slide rule.

Spa-Co-op Pacts

U. S. District Court upholds lease-purchase contracts. Interior will appeal decision

The contract dispute between Southwestern Power Administration and co-ops in that area over transmission and exchange of power appears headed for settlement.

The co-ops recently won a round in their three-cornered contest with Congress and the Interior department. The U. S. District Court for the District of Columbia ruled: (1) that the original SPA-co-op contracts (including lease-purchase of co-op transmission lines) are legal and binding and (2) that Interior could use money from the $1.2 million continuing fund, voted by Congress to SPA for this fiscal year, to carry out the contracts.

Interior Asks Reversal . . . Central Electric Power Cooperative of Linn, Mo., brought the successful court action. Interior is appealing the case.

Even if the district court decision is sustained, the original contracts will not be revived. They depend on Congressional appropriation, and Congress is not likely this year to vote any money for the continuing fund. The House has already turned it down (EW, April 12, p 6).

By Congressional directive, Interior last year declared the original contracts inoperative and substituted interim contracts that do certain things to help the co-ops—until permanent arrangements can be worked out. These interim contracts (which terminate June 30) include a wheeling fee paid to G&T's for transmitting SPA power to delivery points, and they also provide for sale of hydro power to the G&T's and purchase of thermal power from them.

If the court ruling is upheld, Interior will have to pay the co-ops on the basis of the original contracts.

Integration Contracts . . . Meanwhile, co-ops and private utilities in the area apparently look forward to working out integration contracts that will take care of area needs (EW, April 12, p 6). As an indication of this hope, Central has given Interior a detailed tabulation showing justification for funds needed by SPA to maintain the interim contracts until permanent arrangements can be completed.

Much Honored Utility President

Frank M. Wilkes, president of Southwestern Gas & Electric Co, Shreveport, La., displays trophies awarded him by East Texans last month. He is holding engraved silver tray presented him in Longview for "outstanding service to East Texas in industrial development." This award is made annually by "Longview News and Journal" to area's industrial leader. On Wilkes' desk is the plaque he received from Kilgore Chamber of Commerce. Plaque cited Wilkes as "Outstanding Citizen of the Southwest; Leader in East Texas Industrial Development; Champion of American Competitive Enterprise."

Project Coordinating Unit Asked in Missouri Basin

A new proposal for federal-state regulations of Missouri Valley development—power, water, flood control, irrigation, and the like—has been introduced by Sen Thomas C. Hennings, Jr, (D-Mo.).

The Hennings' bill would:

1. Create a Missouri Basin Commission appointed by the President, which would "have authority to coordinate" functions of various federal agencies operating in the valley.

2. Create a Missouri Basin Compact Board, appointed by governors of the ten basin states, which would have authority to delay, at least temporarily, anything the federal commission might propose to do.

Hennings' proposal isn't going anywhere very fast. His office is polling other senators from the affected states, and has already found opposition. State governors are being given a look-see at the bill and the Hennings' explanation of it. Pro-valley authority groups oppose the bill.

The question of constitutionality of a two-agency setup has already been raised. Under the bill, the state-appointed compact board would, in effect, be given a say-so in the area which the constitution reserves to the federal government: interstate commerce, navigable streams, and the like. The Hennings board wouldn't be accountable to Congress, but could delay any commission proposal.

Air Pollution Abatement Legislation Being Studied

A parade of federal government and municipal officials favoring the air pollution abatement amendment to the housing bill appeared before Senate Banking Committee last week.

The measure under consideration would allow 100% writeoff in five years of costs of pollution abatement equipment, provide for mortgage money guarantees, and allocate $5 million for pollution research.

IN THE INDUSTRY

Ever since the electric utility industry started its postwar expansion program, there has been as much talk about the need for engineers as for materials and money.

Engineers are a necessity in industry growth

To design, manufacture, erect, and operate the machinery which has made possible our great industrial progress of the past decade engineers have been a necessity. And in this decade engineers have always been in short supply. Here are some reasons for this shortage:

1. Many potential engineers were lost in the thirties because of lack of money to attend college.
2. The armed services expanded and absorbed many engineers. Some of the younger ones lost their lives in battle.
3. Only a small percentage of American youth has the specialized ability to complete the difficult and arduous four-year engineering courses.
4. Because of the decline in birthrate in the depression years, fewer boys have been reaching college age since 1949.

Two additional reasons cut the supply for the electric utilities still further:

1. Most electrical engineers have been turning to the high-frequency field.
2. Non-regulated industries with earnings at new highs have been able to lure the new graduates with higher salaries.

ASEE Has Proof Of Engineers' Shortage . . . Proof of the shortage of engineers is offered by the American Society for Engineering Education. ASEE keeps tab on the enrollment of engineering students in practically all American universities and on engineering degrees conferred. Its annual report on these data is now available in the February issue of "The Journal of Engineering Education."

The picture drawn from this report is a cloudy one, but there are indications that the sun will peak through about June 1956. Since the 1946-47 school year only 222,706 bachelor degrees in engineering have been conferred. Of these about 90,000 were electrical and mechanical, the main sources for utility company engineers.

The maximum number of electricals who can be graduated by June from colleges with curricula approval by the Engineers Council for Professional Development is approximately 4,600. Failures, death, illness, the armed services, graduate work, and teaching can conceivably reduce the total to 3,000 for the many industries employing electrical engineers.

Evening Courses Supply Many Engineers . . . Evening courses may possibly supply up to 1,000 others. But many of these are already working. Their degrees will only make them available for advancement from the minor positions they now hold.

The 1955 electrical graduates will number about 800 more.

Mechanicals eligible for graduation this year will run about 5,200 plus about 800 from evening courses. The 1955 group may be about 1,000 more.

But then the tide should turn. As of last October there were 7,985 potential BS in EE graduates for 1956 and 9,280 for 1957. Naturally attrition in these classes will be high. But in each of these years the number of graduates should be higher than in 1954. This is especially so as these figures do not include evening students. The total for the BS in ME group for 1956 is 7,721 and for 1957 group, 8,988, again without counting evening students.

It is interesting to note that in these years leadership in number of graduates will shift from mechanical to electrical engineering.

One of the most startling developments of recent years is the number of electricals seeking advanced degrees. At present there are 5,827 men alone (only 13 women) studying for master degrees. Most of these are in evening courses. But 1,823 are studying days either full or part time. Another 797 are studying for their doctorate.

Many electric utilities have proved by their efforts in promoting engineering careers among high school students that they are aware of the industry's great demand for engineers. Such activity might well be taken up by all electric suppliers. In an industrial country such as the United States there can never be too many engineers. Without them there can be no material progress.

It appears that there will be a sufficient number of engineers graduating to take care of the needs of the expanded electric industry by 1957.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Aluminum as a cable sheath material weighs ¼ as much as lead, is 6 times stronger, 7 times harder, and 25 times as resistant to vibration fatigue. Electrical conductivity is also 7 times better.

Engineering can only be calculated for 10%, the other 90% comes from experimentation. Why then should differential equations scare kids away from engineering? (C. F. Kettering)

Heat trap advocates may face a demand to prove the economic virtue in plants that can get down to 9,000 Btu/kwhr on fuel that costs only 15 to 16¢ per million Btu.

Blowing out superheaters, headers, and piping with air and sponges before assembly should avert the necessity of doing it afterwards to remove debris.

Dielectric strength of 32-mil, mica-paper segment-plate for commutator insulation is about 1,200 v per mil.

Tie wires clipped above the conductor leave a sharp point sticking up which will puncture rubber blankets or other rubber protective equipment. Tie wires clipped below the conductor avoid this risk.

High ash resistivity (over 2x10 ohm-cm) may cause severe sparking in an electrostatic precipitator even at relatively low discharge electrode voltages. Lowered efficiency results.

Experienced operators know many things that would help designers avoid repeating mistakes.

Glaze-melting probably goes awry more often because of ice-locked switches than from any other cause.

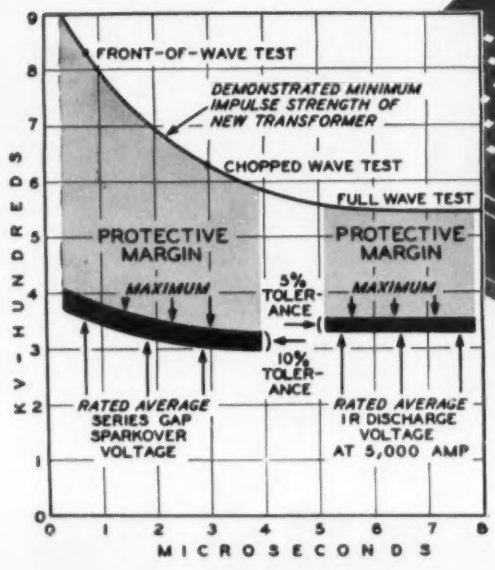
the most important arrester characteristic is

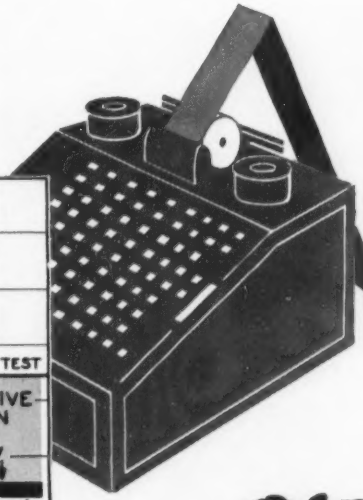
FIGURED IN DOLLARS

A lightning arrester functions at a given voltage level below the point of possible damage to protected apparatus. This point is the minimum impulse insulation level, or BIL of the equipment. How much "spread" or Protective Margin does a certain lightning arrester provide? What do you pay for it? In simple terms, this is the story of *any* lightning arrester.

What is the story of the O-B Thorex? It's just as simple and direct. First: The Thorex is rated in terms of MAXIMUMS, namely, with full tolerance applied to average listed values, so that *every* arrester is as good as, or better than stated. Second: Protective Margins are figured, conservatively, between this MAXIMUM point and equipment BIL. Third: You get substantially more Protective Margin, per dollar, when your apparatus is guarded by Thorex.

*Protective Margin, as illustrated in this typical application curve, is that zone existing between MAXIMUM arrester protective rating (tolerance added to average rating) and minimum insulation strength of equipment.





Ohio Brass

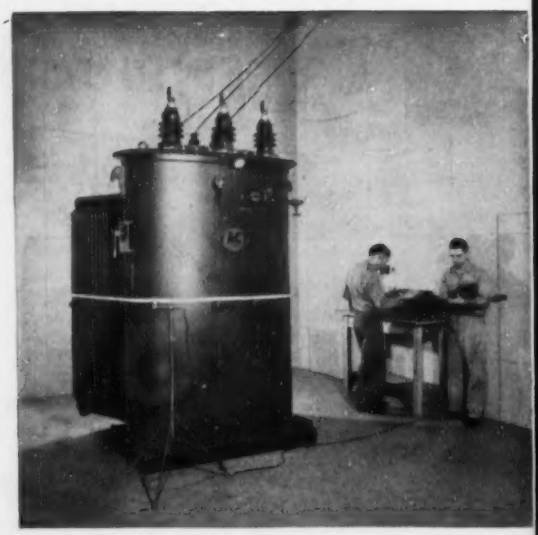
MANSFIELD OHIO, U.S.A.

4423-41

A Quiet Transformer Makes

Allis-Chalmers sound laboratory has been the proving ground for making good neighbors. Constant research in magnetostriction and resonance gives clues to better design.

Huge doors lock out external noise after transformer is in position for testing. Allis-Chalmers sound laboratory has been in use since 1949.

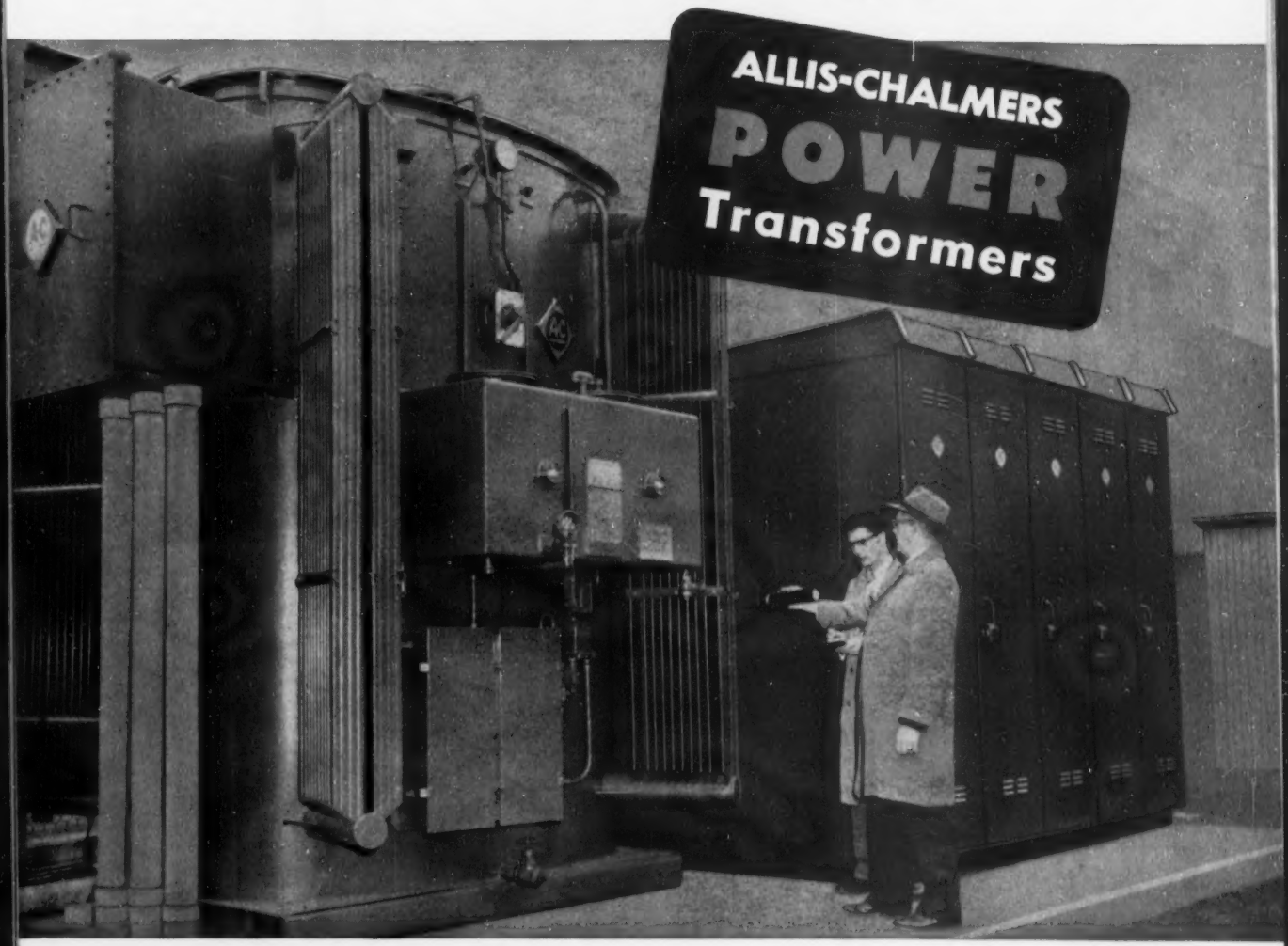


Analyzing noise for harmonic content on a 1000 kva transformer. Ambient noise level of laboratory is 28 d.b., a reduction of approximately 42 d.b. from level of outside noises.

A distribution transformer gets audio sound level tests. Physical noise level testing instruments and harmonic index are new tools in the measurement of sound energy.

ALLIS-

a Good Neighbor



Good neighbors are quiet neighbors. To help utilities become welcome neighbors in residential and commercial areas, Allis-Chalmers has been applying to its transformers and substations the lessons learned in its large sound laboratory, which was placed in operation in 1949.

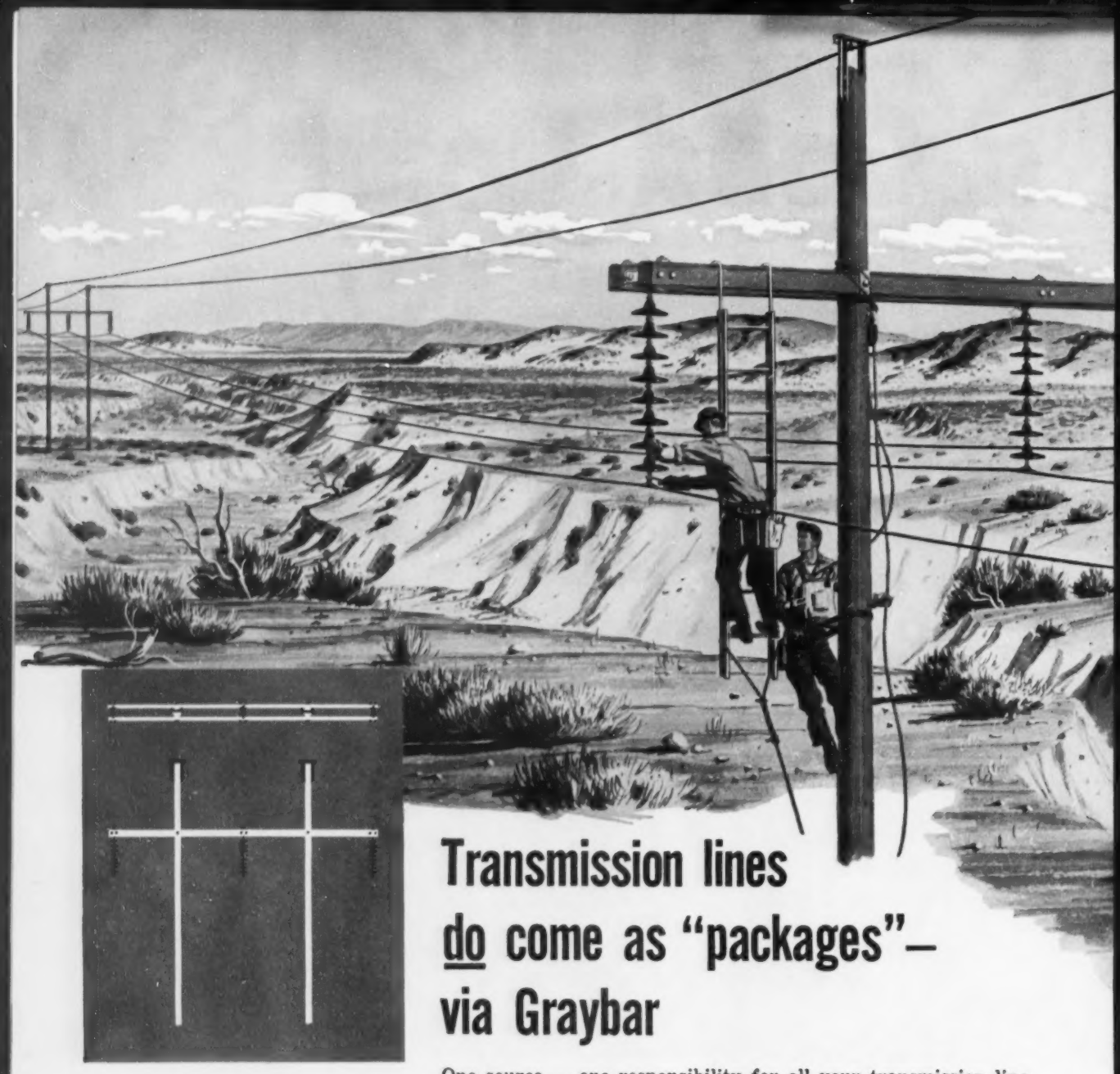
The laboratory houses modern, complex equipment for accurate audio sound measurement within two-foot thick walls of concrete, glass wool and acoustical tile. The sound laboratory has its own foundation and is removed from any manufacturing disturbances.

Intensive research, now in its fifth year, has resulted in uniformly quiet transformers throughout the range of sizes constructed. Proof comes in the field when tests show reduced sound levels on transformers like the one pictured above.

Thanks to this constant research carried out by Allis-Chalmers, you get a transformer that is the best kind of neighbor available. A-4196

CHALMERS A-C ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN



Type No. 700
Tangent Structure
for voltages 69 to 154 KV*

LIST OF MATERIAL

Quantity	Description
2	Crossarm
3	Steel spacer fitting w/mounting bolts
2	Stud bolt ⅞" w/2 washer nuts
4	MF locknut ⅞"
2	Static wire support
4	Machine bolt ⅝" w/locknut
2	Clevis
2	Suspension clamp for static wire
as req'd	Suspension insulator and fitting

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IN OVER 100 PRINCIPAL CITIES

New NW Firm Plans Big Dams

Pacific Northwest Power Co, made up of 5 utilities, studies proposals for building dams on Clearwater, Columbia Rivers

Incorporation of a $50-million company to be known as the Pacific Northwest Power Co (EW, April 19, p 101), formed under Oregon code but with headquarters in Spokane, Wash., moves the power resource development program of five private utilities of the Pacific Northwest closer to construction phases. The new corporation, made up of five companies, is looking toward building Columbia basin hydroelectric dams and transmission facilities to meet future load growth of their 800,000 customers.

Robinson Is President . . . President of the new firm will be Kinsey M. Robinson, president of Washington Water Power Co., Spokane, Wash. Named in the incorporation papers as vice presidents and directors were officers of the other four companies: J. E. Corette, president of Montana Power Co; Paul B. McKee, president of Pacific Power & Light Co; T. W. Delzell, board chairman of Portland General Electric Co, and A. W. Trimble, president of Mountain States Power Co.

Initial capital paid in by the five companies was $5,000, the joint announcement said but capitalization plans call for 5 million shares of $10 par value common stock. It was explained the five firms vary greatly in size and power needs and will not necessarily share equally in financing the construction of dams or other electric generating facilities.

Public Power Can Participate . . . A spokesman declared that while the initial corporation plan embraces investor owned utilities, the new firm would not be opposed to including other firms or local public agencies in the program intended to boost the region's energy supply from projects too large for single firms to finance.

The companies jointly had filed with the Federal Power Commission for preliminary permits to conduct investigations of two sites on the Clearwater River in northern Idaho. The sites are the Bruce's Eddy and Penny Cliffs which together are believed capable of supplying 536,000 kw of energy. There would also be downstream benefits to the federal powerhouses at McNary, The Dalles and Bonneville Dams.

KINSEY M. ROBINSON

While the companies are preparing to finance the projects they are exploring the possibility of federal aid for flood control benefits.

Present plans do not consider long-range transmission, which, initially at least, would be handled through the Northwest Power Pool. It was explained that power drawn to western Oregon by PP&L and PGE, for example, would not actually be transmitted from the Clearwater facilities, but be drawn from the pool and balanced by generation feeding into the pool at the Idaho-Washington end.

Ebasco Is Consultant . . . Ebasco Services, Inc, was named as the new corporation's engineering consultants. It was explained only "paper studies" of the Clearwater sites and dams have been made to date. A first act will be the field studies of proposed projects.

The companies have installed generating capacity of 1.4 million kw and estimate joint need for additions of between 150,000 and 200,000 kw annually to meet area load growth.

Construction of the John Day Dam on the Columbia main stem, a site between The Dalles, presently under construction, and McNary Dams between Washington and Oregon, might be undertaken by the new company. Delzell of PGE, the company which has been pushing for partnership development of this large multipurpose dam, said the directors of the new company had "discussed" John Day among potential projects but he added "no commitments" had been made. Delzell explained PGE is still exploring the possibility that this project might be jointly financed by private and public utilities of the region, perhaps with private industry—presumably aluminum companies—assisting.

WSPC Loses Bid for BPA Dump Power

Undersecretary of Interior Ralph Tudor reports Interior has rejected the request of the Washington State Power Commission for all dump power available to Bonneville Power Administration from federal Columbia River projects . But Tudor said he has authorized Bonneville Administrator William A. Pearl to explore with WSPC officials "the suggestion that a statewide body such as . . . (WSPC) purchase and resell part or all of the federal energy which may be disposed of within your (Washington) state." Tudor said he thought "there is merit in exploring the idea."

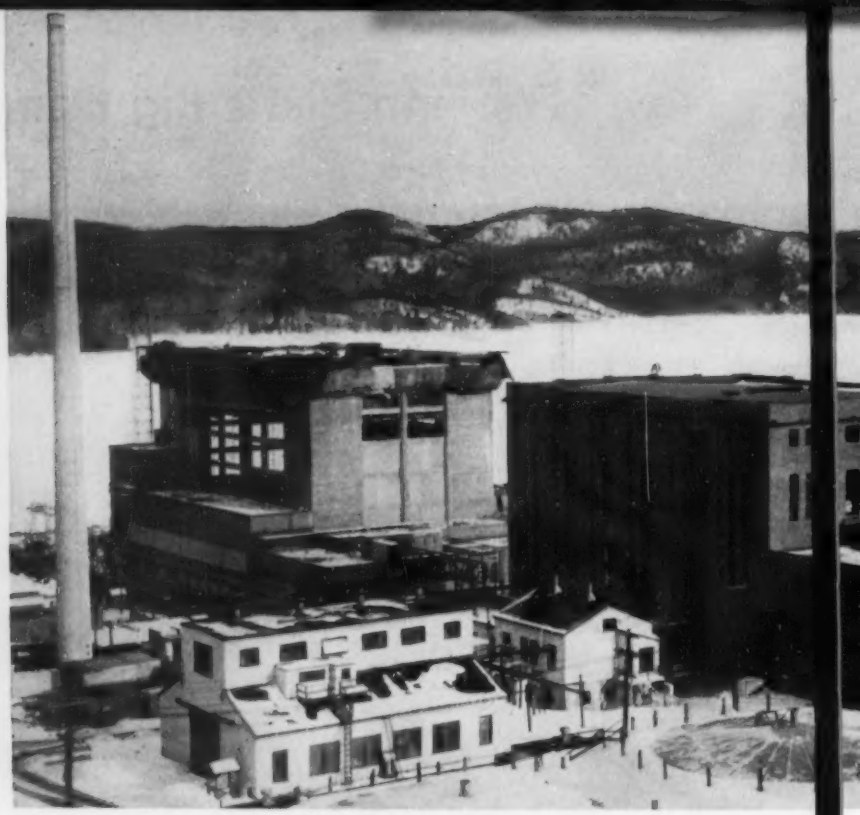
Speaks for Interior . . . Secretary of Interior Douglas McKay later said Tudor spoke for the department. The policy statement was made in a letter to Walter S. Gordon, Washington State Power Commission Chairman, and J. Frank Ward, WSPC managing director.

Tudor declared in the letter:

"I am not favorably impressed with the suggestion that the Bonneville Power Administration make a long-term commitment to your commission for 'all secondary interruptible and dump energy' from the Northwest federal power system. As I understand this suggestion, it would in effect amount to an option to be exercised by you as you might bring in steam plants or find other uses for this energy. We are not sympathetic to giving such options but believe it to be better to restrict ourselves to ordinary energy sales contracts which are for specific purposes. Furthermore, we believe that it would be inequitable to give one state or one customer such an exclusive option."

(*Continued on page* 52)

GEIGER COUNTER is used as a check against radioactive contamination at . . .



Chalk River Plant, Canada's atomic center in Ontario. Small white building, left, houses ZEEP reactor, first outside U. S. Building at right has NRX, one at rear will house NRU

Within a framework of security . . .

Canada Plans Commercial Production

Canadian atomic energy authorities are shaping a program of research and development aimed at the commercial use of reactor-made power in eight or ten years.

While major technical problems or power reactor design and operation remain to be settled, the conclusions they have reached represent a considerable change from the thinking that has prevailed in Canada.

Up to now the general assumption has been that the country's untapped resources of water power would be ample to meet power needs for so many years to come that reactor-generated power could have little or no use, since it was bound to be much more costly.

There was vague talk of constructing an experimental power reactor some time after the second research reactor (NRU) now under construction at the Chalk River research centre was completed. But there was no urgency about it.

Now a definite program has been laid out. This comes as a result of a new appraisal of the water-power resources available in Canada's most highly industrialized region, Southern Ontario. Objective is to have a power reactor in being around 1962 which can feed power into the Southern Ontario power grid at a cost of five to six mills per kwhr, or about the cost of producing power from steam-drive generators using coal at $8 a ton. Stated in other terms, the objective is to deliver atomic power on a competitive basis with coal-fired steam power in a region remote from coal mines.

Ontario Hydro Steps In . . . First step in the program is now under way. Hydro-Electric Power Commission of Ontario has assigned specialists to work with scientists from the staff of Atomic Energy of Canada Ltd on a feasibility study to prepare designs and cost estimates for a pilot atomic power plant. It is planned to have the pilot plant operating in three years and to run it for about two years before building a full-scale commercial reactor to be in operation about 1962.

Steam coal delivered at Ontario Hydro's two present steam plants, one at Toronto and one at Windsor, now costs about $8 a ton. It is not expected that cost will go down since coal must be hauled from Alberta with a federal government freight subsidy or from American mines. Hence the objective is to have atomic power at competitive cost at the time when Ontario runs out of water power.

Power requirements of the Southern Ontario region have increased from 498,000 kw in 1922 to 2,766,000 kw in 1952. Present water resources

ARMED GUARDS protect the plant from unauthorized persons. Within the grounds scientists study atomic energy for peace and war

# of Power from the Atom

are sufficient to sustain an increase at the same rate (about 6% a year) until 1958. The bringing in of the St. Lawrence River Power Project will see the region through until 1962.

Other industrial areas in Canada are better off. They have either greater water power potential in relation to growth requirements or local coal supplies.

Even on a national basis, however, the prospect is that Canada will need to develop thermal power in considerable quantities in the not distant future and that atomic plants will be an alternative to conventional types varying in attractiveness in different areas if the development program now settled attains the cost objective.

Water Question . . . Canada's water power resources are estimated at 50 million kw, of which about 20% is now used. But it is believed only about 30 million kw can be made available in presently developed industrial areas. Some major power sites such as the Hamilton River in Labrador and the Yukon River in the northwest are near the seacoast. They are expected to become the sites of new and specialized industries, ready to move into uninhabited areas because of cheap power and cheap transportation, as the aluminum industry has already done at Arvida, Que., and Kitimat, B. C. It is not believed, however, that anything like all of the water power sites scattered across the Canadian north are ever likely to be used.

So assuming a national power potential of 30 million kw and a quadrupling of power requirements in 25 years it is expected there will be a power deficiency of 5 million to 10 million kw by 1979.

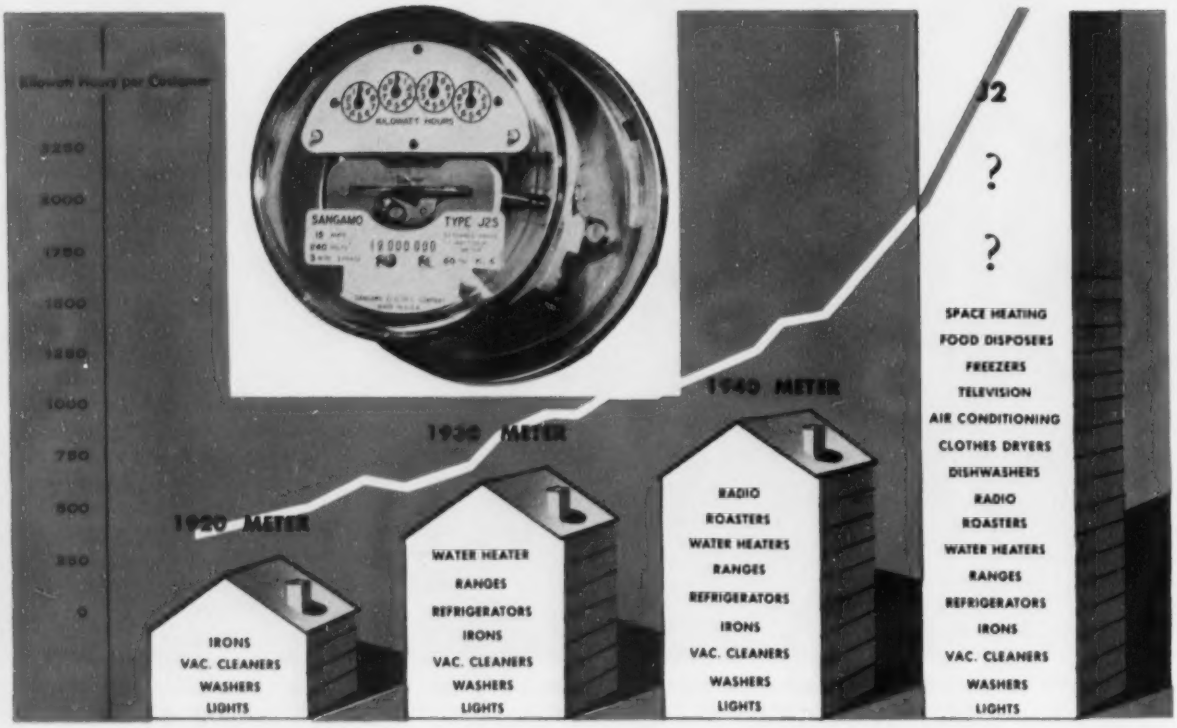
Pending completion of the feasibility study now under way, Walter Bennett and the other men in charge at Atomic Energy of Canada decline to discuss the program in terms of the amount of money required or the type of reactor favored. The government, however, is spending $40 million on the NRU reactor and is presumably ready to put a comparable sum into the development of a power reactor now that the decision has been made. It is apparent, however, that the development on the physical side is likely to be based on Canada's existing experimental reactor, NRX and the larger NRU, now nearing completion. These are slow reactors using natural uranium rods as fuel and heavy water as the moderator.

In a recently published paper I. N. MacKay, plant design expert of Atomic Energy of Canada, describes the probable modifications which would be made to adapt the pattern of NRX and NRU to power generation. He said capital cost would be high but fuel costs for a pilot plant produsing 5,000 kw would be very low. Except for failures no new rods would be needed in the first three years of operation. He thinks the most economical size of power reactor would be larger than this, probably with an output of at least 100,000 kw. Such a reactor would use up 10 or 12 rods a week.

As little as a year ago Canadian authorities were saying power would be synonymous with hydro in the Dominion for years to come. Now they've taken another reading and found there soon may be another synonym: the atom.

WALTER BENNETT heads Atomic Energy of Canada Ltd, which directs the nuclear project

THE NEW SANGAMO TYPE J2



the watthour meter with EXTENDED RANGE

to measure the nation's growing power load . . .

The immense growth of residential power loads during the past thirty years is only an indication of the load growth of the future. Surveys on today's use of service entrance equipment indicate the electrical industry's awareness of the urgent need for adequate wiring.

Adequate *metering* will be needed, too. Accurate measurement of the loads of the future will require a watthour meter with straight line accuracy up to 100 amperes—a meter capable of handling all forseeable increases in average residential consumption. That's why Sangamo has developed the J2, a meter with reserve capacity fully adequate to meet future load growth.

The new Sangamo J2 will protect your investment in new meters by providing sufficient reserve capacity to meet any contingency of future load growth—sustained accuracy with minimum maintenance during its entire life—at *no increase in cost or price.*

Sangamo presents the new J2 with full confidence that this singlephase watthour meter—the finest in Sangamo history—will prove a much needed advance in meter design.

Get the facts . . . mail the coupon below for your copy of "Protect your Investment in New Meters." It's just off the press, and gives the complete story of the evolution of the Sangamo Type J2 . . . the Meter with reserve capacity for growing loads.

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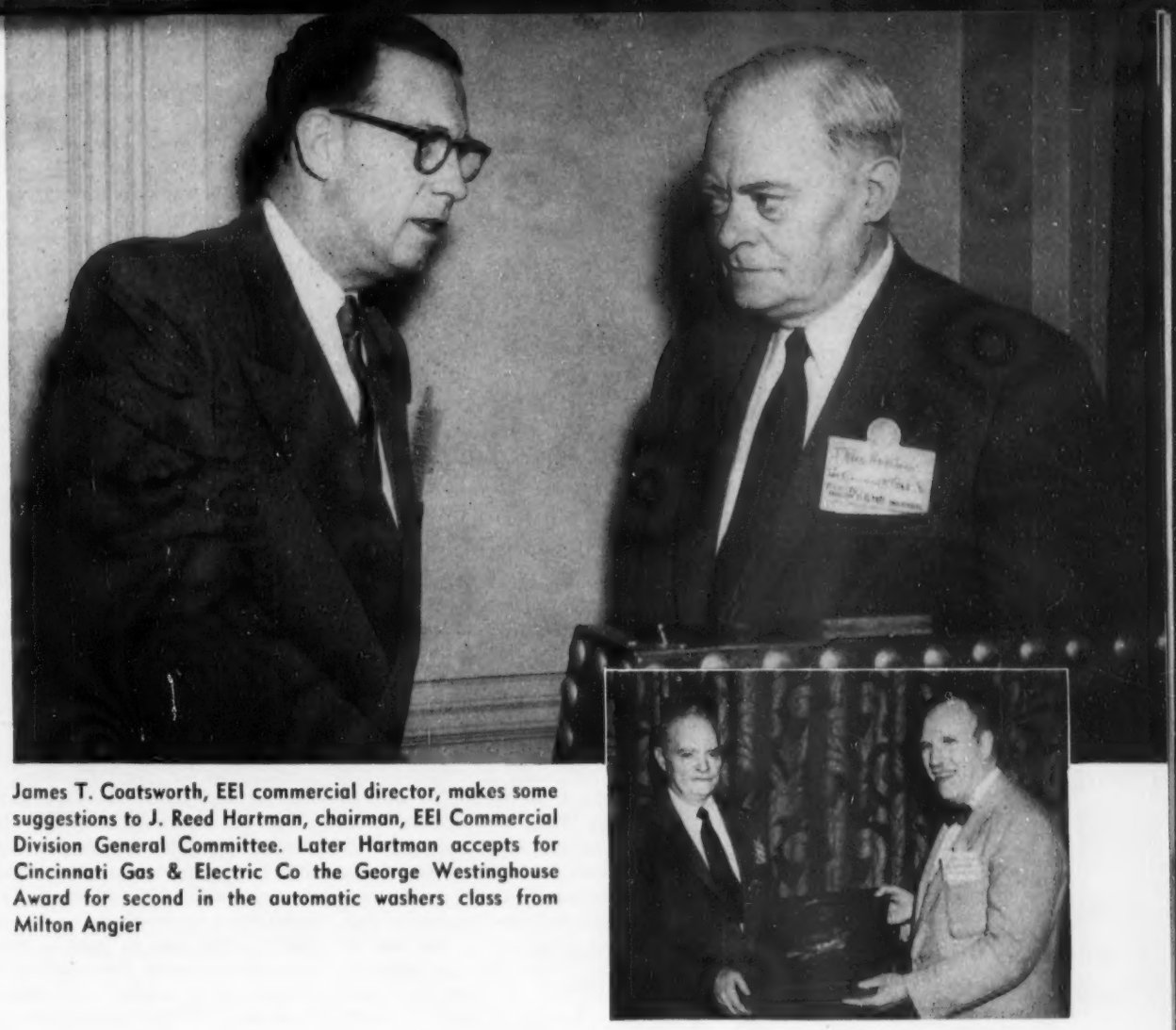


James T. Coatsworth, EEI commercial director, makes some suggestions to J. Reed Hartman, chairman, EEI Commercial Division General Committee. Later Hartman accepts for Cincinnati Gas & Electric Co the George Westinghouse Award for second in the automatic washers class from Milton Angier

Optimism Keys EEI Sales Meeting

Plenty of capacity now exists for production of electricity and of the appliances and equipment to use it. The race to keep up with demand is ended. The job now is to spur demand into taking the electricity and the electrical goods that can be produced.

That was the message dinned into the ears of the thousand or more power company and other electrical industry people at the annual spring sales conference of the Edison Electric Institute, April 4-8, at Chicago.

Walter Sammis, EEI president, looked ahead to the installation of the 100-millionth kilowatt of generating capacity later this year. But, he asserted, the aim of the industry should be the 100-millionth kilowatt of load, rising from the 81.2 million-kw peak in 1953. This is a challenge to the industry's selling organizations, combining with the vast increase in manufacturing capacity for production of electrical goods.

Instancing the potentialities of lighting, television, ranges, water heaters, freezers, air conditioners, the many appliances used in the home, R. W. Johnson, General Electric Co, said that many utility sales executives must be asking these questions:

"Is our sales force adequately staffed? How does it compare with other utilities and with other years? How much are we spending on promotion per dollar of increased revenue? Is it enough? Is our sales force adequately trained? Can manufacturers help us? Are our sales techniques up to date? Are we using sufficient promotional aids?"

Two key factors will greatly influence the future increase of electricity use by industry, said Tom Fort, Westinghouse Electric Corp. First is the need for industry to free itself from the web of rising labor and materials costs. Second is the fact that productive man-hours available to industry will be no more ten years ahead than are available now. To achieve the 23% increase in industrial

JUST ARRIVED is C. M. Wallace, Jr, second from left, vice president, Georgia Power; with W. Paul Lyman, Carolina P&L; T. D. Hoskins, Louisiana P&L; and P. W. Emler, American G&E

HONORARY LIFE MEMBERSHIP goes to J. L. Burgan, left, New York State E&G Co

production that will be needed by our growing population will require industry to step up its use of electricity by 54%, that use amounting to over 400 billion kwhr in 1963, 15 kwhr per man-hour of production labor.

"All of us should determine today that we will make better farm programs a first order of business when we leave this conference." That was the advice W. A. Lyons, New York State Electric & Gas Corp, gave his hearers early in his talk on "Our Stake in Agriculture." Power companies should develop and maintain real leadership in promoting the use of electricity on the farm, he declared. The tendency to let down, now that the line construction stage of farm service is virtually completed, should be vigorously combatted. The national average farm use of 3,100 kwhr is far below what it should be, what it can be, what it will be. The power companies are the champions of private enterprise. The farm market is a challenge to them.

Seeking a way to restore aggressive selling of electric appliances, George E. Whitwell, Philadelphia Electric Co, suggested that the electric utilities consider a nation-wide activity towards the objective of better-educated, better-trained retailers and appliance salesmen. To help correct the present evils of the appliance trade, Whitwell said that they should maintain list prices if they merchandise, encourage realistic financing of sales, establish and enforce good installation policies, see to it that appliance serving is satisfactory, advertise and promote the use of appliances, and, above all, have the enthusiastic support of their top managements in aggressive and expanded sales activities.

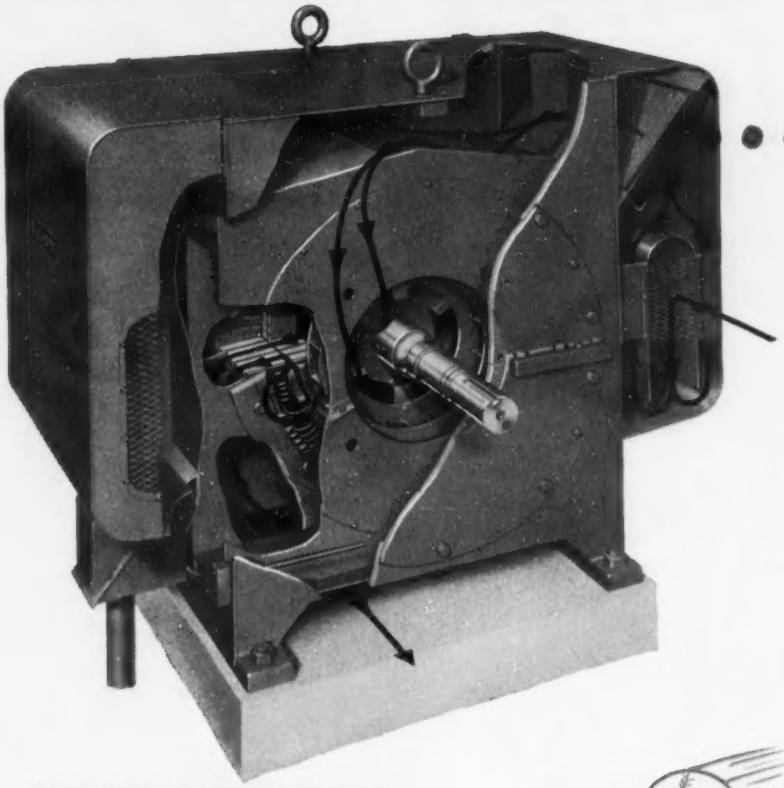
Home Service Conference

"Laundry Leisure" . . . These two words were the program billing of Eleanor Lee Jones, Nash-Kelvinator Corp. But the preferred title of Miss Jones' presentation is "Wonder Ways with a Wonder Laundry," which she demonstrated with slides. They showed how an automatic washer and electric dryer can be used to make washable garments spot-resistant; to remove spots, streaks, and dullness from plastic fabrics; to restore pristine whiteness to grayed nylons; to clean stuffed dolls and animals; to bring blankets, shrunk in previous washings, back to near-original size; to make

RELAXING are F. C. Quinn, El Paso Electric Co; J. H. Warden, Upper Peninsula Power Co; and C. L. Wilson, El Paso Electric Co

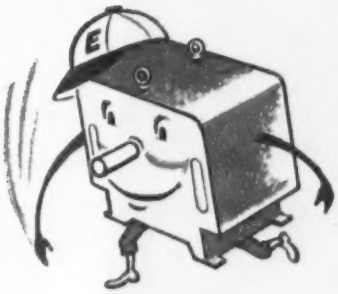
READY to sell more: A. W. Smith, Ebasco Services; W. B. Pickens, Texas Electric Service; F. S. Gregory and R. L. Dunten, Central P&L

ELLIOTT *OUTDOOR SPLASHPROOF WEATHER-PROTECTED* MOTOR



Cutaway view showing passage of ventilating air through the series of ingenious baffles, positively excluding moisture and dirt from the motor windings.

..strikes out building costs



STRIKE ONE

"Blow Thru" inlet and discharge openings prevent high-velocity winds from forcing dust or moisture into the winding chamber.

STRIKE TWO

Many changes in both direction and velocity of incoming air, knock out moisture and dirt. When required a cleanable air filter provides a further positive stop to air-borne foreign matter.

STRIKE THREE

Windings are specially "moisture-sealed," vacuum-pressure impregnated and dipped, insuring complete protection of electrical winding.

Here is a motor that can take any weather

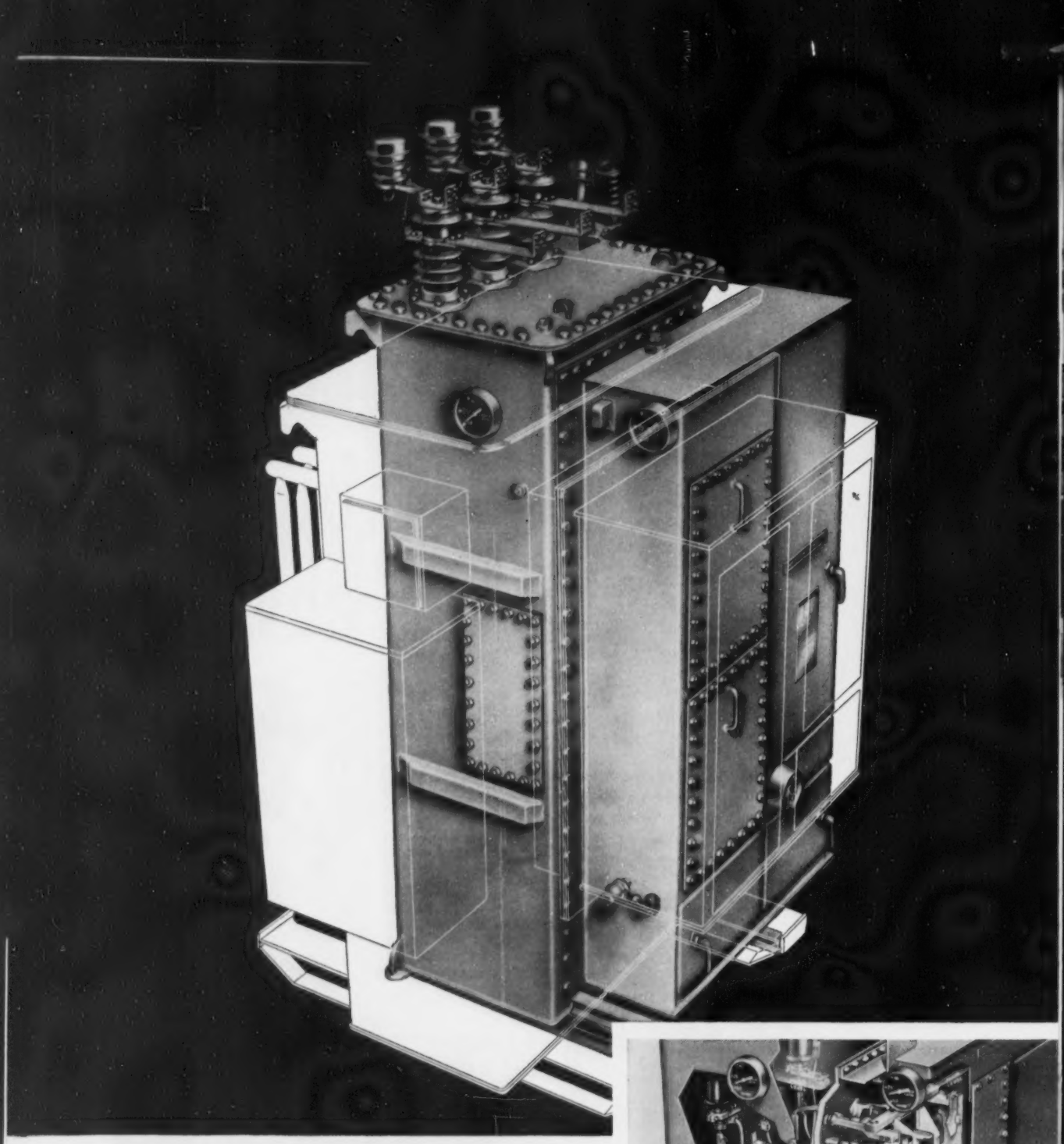
and like it — torrential downpour, raging blizzard, fog, salt spray, sleet — a motor you can put outdoors anywhere and snap your fingers at building costs. Even special installation costs are out — no ductwork, no cored foundation, nothing more costly than a simple concrete slab. Numerous installations from New York to California, Minnesota to Texas, all tell the same story of economy. Get the facts in the new Outdoor Motor Bulletin. Ask your local Elliott representative or write Elliott Company, Ridgway Division, Ridgway, Pa.

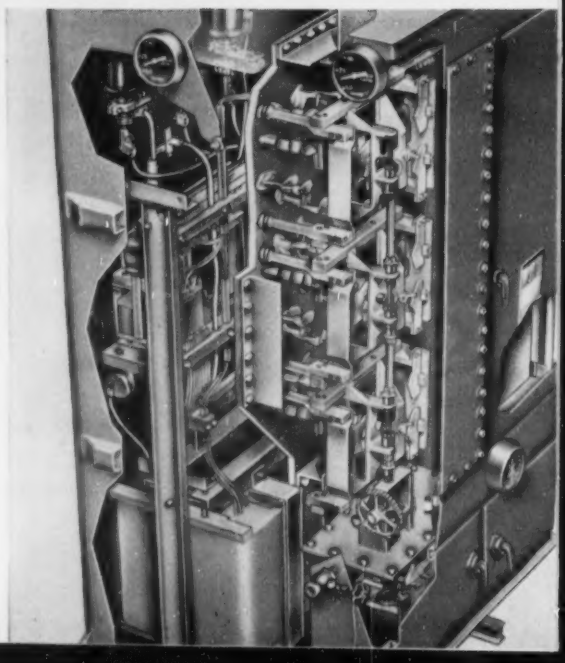
Elliott FABRI-STEEL MOTORS AND GENERATORS

ELLIOTT Company

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

R3-26





The exclusive Westinghouse Tap Changer mechanism has been improved in the new URS. The three phases are arranged "in-line", permitting straight drive from operating mechanism to each phase. Stationary contacts are mounted on a MICARTA® barrier which also separates the tap changer from the transformer compartment. This *eliminates* cable connections in the tap changer compartment and assures complete separation of tap changer and transformer oil. A new unitized core and coil assembly has also been incorporated into the URS. All core and coil units are assembled into a single unit structure independent of the tank, making it easy to remove should maintenance become necessary. These two features are just a few of the many advances which are available to you through continuing Westinghouse efforts to provide better, more reliable voltage regulation apparatus.

THE NEW URS STEP-TYPE STATION REGULATOR . . .

52% smaller, 35% lighter . . . retains ± 1% accuracy for life!

Retaining all the stamina of its predecessor, the new URS Regulator gives accurate, trouble-free regulation in the most compact, easily installed "package" attainable today. In some ratings the new URS is actually 52% smaller, 35% lighter than before. In *all* ratings, size and weight have been greatly reduced.

Better station layout is possible from the URS reduced size—can be installed with smaller pad, no change in station overhead structure.

NEMA standards were used in the new URS to help you in specifying and using regulators in your systems . . .

- Position indicator, easily seen from both control and mechanism compartments
- Terminal drilling, clamp-type terminals can be interchanged
- Jack clearances, same as ASA transformer standards

Lifetime accuracy, reduced maintenance because Westinghouse went much further than just a theoretically better design. Experimental models were built, tested, refined. The SJS Relay . . . Unit Core and Coil Assembly . . . Recessed, "In-Line" Tap Changer . . . are just a few of the many features giving the new URS ± 1% accuracy for a lifetime.

Proved, exclusive features retained, improved to give utilities every service-tested advantage for accuracy and reliability . . .

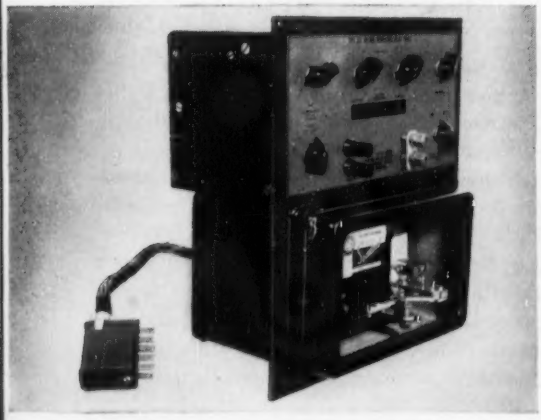
- Reversible terminals permit external interchange of source and load
- Out-breathing only on tap changer prevents oil deterioration
- Geneva gear drive, giving controlled optimum contact speed by direct drive
- Barrier-mounted contacts, no cables in tap changer compartment

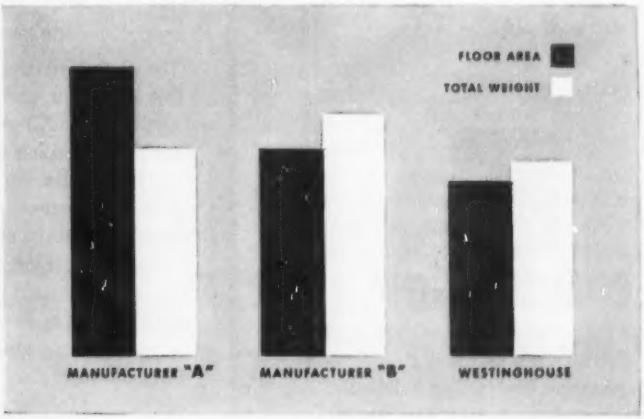
Get full information—NOW

The new URS Regulator has so many extra advantages that it sets a new standard in station-type voltage regulation. Get full technical data and information on how it can bring real accuracy and reliability to your regulation problems. Ask your Westinghouse salesman or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10420

YOU CAN BE SURE...IF IT'S

Westinghouse



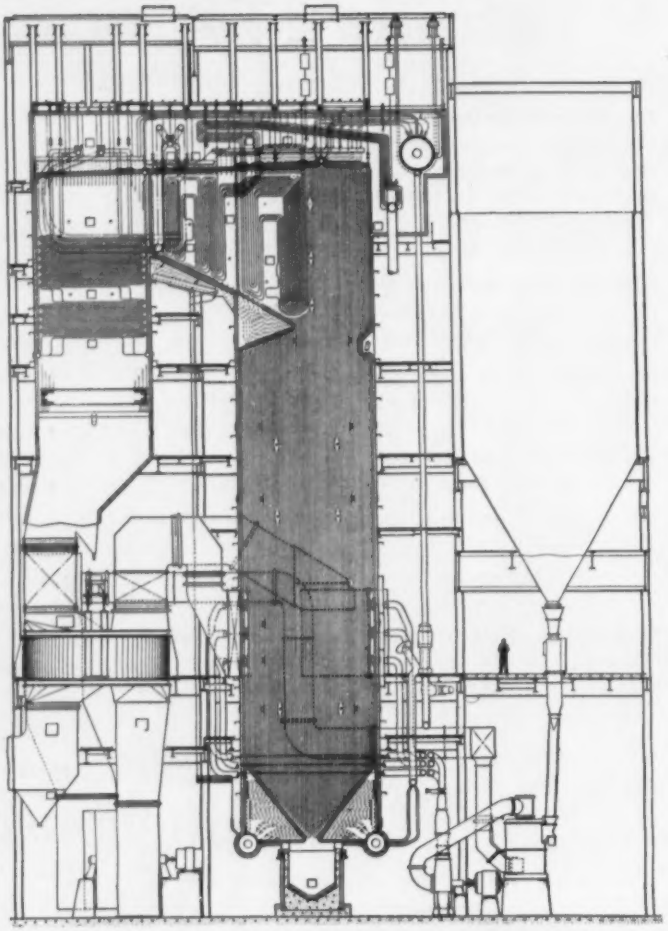


SJS Relay and Control have been specially designed to give ± 1% accuracy for a lifetime. Wear is completely eliminated, there are no mechanical bearings or pivot points. The spring-hinged relay has been subjected to an uninterrupted laboratory test of over 100 million operations under full load—the equivalent of 200 years of actual service—and not a bit of recalibration or maintenance was necessary! **Substantial reduction in size** makes the new URS Step-Type Station Regulator the smallest and lightest of its class in the industry. With the URS lifetime accuracy and reliability, these advancements give utilities the most precise voltage regulation obtainable in its class.

KINGSTON STEAM PLANT

Tennessee Valley Authority

C-E controlled circulation boilers



The C-E Unit shown above is one of five duplicates now being fabricated for the Kingston Steam Plant of the Tennessee Valley Authority at Kingston, Tennessee. There are four additional units, the first of which was recently placed in service.

These units are each designed to serve a 200,000-kw turbine-generator operating at a throttle pressure of 1800 psi with a primary steam temperature of 1053 F, reheated to 1053 F.

The unit is of the controlled-circulation, radiant type. It is a separated furnace arrangement with secondary superheater surface at the outlet of one furnace and reheater surface at the outlet of the other. Primary superheater sections and economizer surface follow both the secondary superheater and reheater surfaces. Regenerative air heaters follow the economizer surfaces.

Pulverized coal firing is employed, using bowl mills and tilting, tangential burners.

B-745

C-E

COMBUSTION ENGINEERING, INC.

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

fabrics fire resistant; to give a semi-permanent crispness to organdy garments and curtains.

"Let's Have Breakfast" . . . Anna Bines, Texas Electric Service Co, showed how the advantages of electric food preparation could be enjoyed by the use of small appliances. She did it by preparing a sumptuous breakfast in front of the audience—

These appliances, said Miss Bines, use no electricity sitting on a shelf. Their owners need only a few suggestions to inspire their regular employment in meal preparation. There are many households that for one reason or another are unable to have an electric range, but they can have the small appliances that will give them much the same advantages.

Freeze It . . . If all homemakers knew as much about home freezers and what can be done with them as Adelaide Fellows, Philco Corp, then the sale of these useful appliances would climb rapidly. This was amply demonstrated by her talk and the display of foods that illustrated it.

The trend in home freezers, said Miss Fellows, is toward increasingly larger ones as people become educated in their use. From the standpoint of price it is wiser to buy the large models because the cost per cubic foot of storage space drops as the size increases.

TV Lore in 1954 . . . This talk by Florence P. Hanford, Philadelphia Electric Co, was a "how to" presentation all the way. Here is her advice:

"From the standpoint of your audience you are right in their living rooms. They invited you in. They can see right into the oven, into the pots and pans, into the bowls. They see every spot and are aware of every mistake; so you must be as sure as you can that there are no spots and no mistakes. You must strive for perfection. This requires careful planning and constant attention to details. You can't be perfect, you probably wouldn't want to be, but you should strive for it.

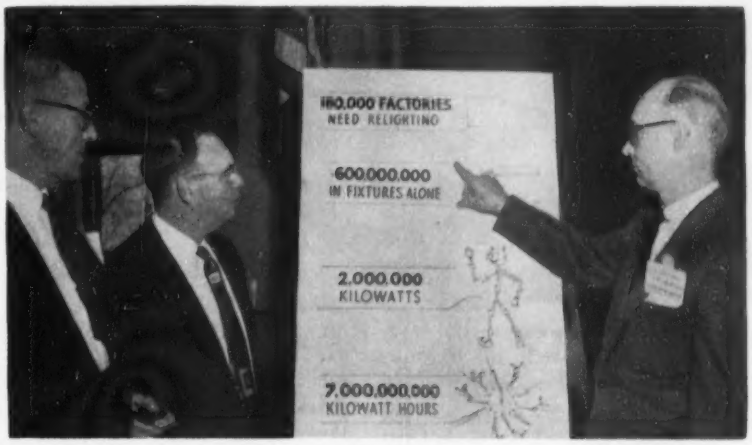
Lighting for Better Living . . . After describing and showing slides of the elements of this instruction program prepared by the Better Light—Better Sight Bureau, Elizabeth Williams, Monongahela Power Co, told how it was put to work.

Invitations were sent to 36 home economics teachers in colleges and junior and senior high schools and 23 accepted. They attended an all-day Saturday workshop.

As a result of the first workshop, a request was received from a county superintendent of schools to conduct another for teachers of that county. Two more workshops sponsored by the State Department of Education are scheduled for June.

"Range Buy Lines" . . . Any utility home service girl who heard and saw the demonstrations on how to sell electric ranges staged by Lura Jim Alkire, head of General Electric's Consumers Institute, and who did not have her head crammed with new ideas, must have slept through the whole thing. Lura brought out many themes and suggestions for introductions of demonstrations, ways to use special groups of people to spread the range story, methods of illustrating sales points, and ways to secure audience participation.

EEI PRESIDENT SAMMIS poses with Merryle S. Rukeyser, business news columnist



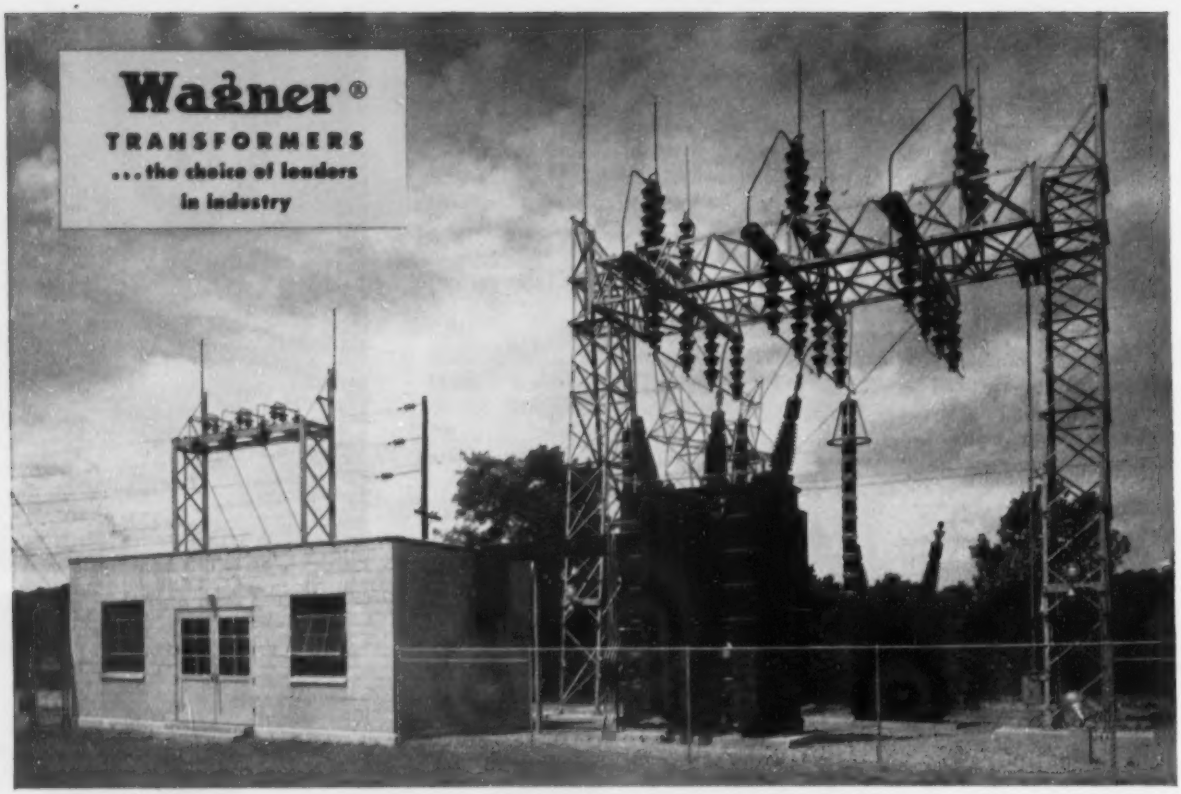
INDUSTRIAL SECTION speakers were J. H. Coates, Ebasco Services; P. W. McCormick, Union Electric Co, presiding chairman; and C. C. Shotwell, Philadelphia Electric Co

Residential Sales Section

"Let's Oil Up Our Selling Machine" . . . Plans for coordinated effort of manufacturers and utilities in major appliance promotions were disclosed in detail by H. H. Brennan, Pennsylvania Power & Light Co. "If your sales machine is a little rusty, running by leaps and jerks, not its fullest efficiency," said Brennan, "I recommend you try this new oil—EEI's Major Appliance Promotional Program."

Already enrolled in the program are 131 companies with a total of 27 million meters. For spring promotion they have bought 17,019 range display kits, 627,500 "Be Modern—Cook Electrically" handout pieces, 19,200 range "User Bonds," 10,221 water heater display kits, 243,400 copies of the water heater handout piece.

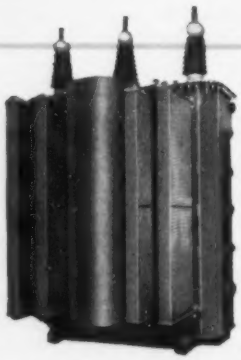
A series of slides was presented with accompanying explanations of each activity by the recorded voices of the men in charge of each—publicity, C. Fred Westin, Public Service



6000 kva Wagner Power Transformer at L-O-F Fiber Glass Div., Parkersburg, West Virginia.

twentieth-century alchemist

The ancient quest for gold from dross has a successful modern counterpart in the transformation of sand and ash into cloth. Such present-day alchemy is big business for the Fiber Glass Division of Libbey-Owens-Ford Glass Company. At L-O-F's Parkersburg, West Virginia Fiber Glass plant, silica sand and soda ash become fiber glass for industrial textiles and insulation material. Electric power is the vital force that does the job. A 132,000 volt line into the plant provides that power—power for melting and control of the forming operations of the glass, for driving thousands of spindles, for driving pumps, and for air-conditioning. This power is stepped down to 4,160 volts by a 6000 kva Wagner Power Transformer at the plant. Wherever electric power is used, Wagner Transformers efficiently and dependably handle their never-ending job of supplying proper voltages for every purpose. Let a skilled Wagner engineer discuss your transformer needs with you. Call the nearest of our 32 branch offices, or write us direct.



A typical 5000 kva 3-phase Wagner Power Transformer.

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE
BRAKE SYSTEMS—
AIR AND HYDRAULIC

WT54-5

Electric & Gas Co; ranges, R. L. Coe, Union Electric Co of Missouri; water heaters, E. J. Hurley, Detroit Edison Co; freezers, B. F. Shields, Potomac Electric Power Co; dryers, W. T. Clark, Cleveland Electric Illuminating Co; Nema participation, R. A. Rich, Philco.

A New Idea in Water Heating . . . If the electric utilities should standardize on a higher-wattage, smaller-tank water heater, should abandon the idea of off-peak charging, and establish realistic rates for the service, then the customer would be better served, and water heater load and sales would rise rapidly. So stated George T. Bogard, General Electric Co.

He gave four reasons why electric water heaters are not sold in ever-increasing numbers. The price of an electric unit is up to 100% greater than that of a comparable automatic gas heater. There is a widespread belief that an electric heater:

1. Will not deliver all the hot water wanted when it is wanted.
2. Costs more to install.
3. Costs more to operate.

The first two deterrents can be minimized by offering a small-tank heater of sufficient wattage for a recovery rate comparable to that of gas. Many utilities have found, and others can find if they wish to, workable solutions to the problem of installation cost. The cost of operation is really not so important as it appears. The sales history of the electrical industry supports the belief that people will always pay more for a superior service. Possibly a 1¢ rate is not necessary for water heating service. Maybe uncontrolled service could be sold for 1.25 or 1.5¢.

Backing up his arguments, Bogard cited data from close records obtained on the operations of experimental 40-gal heaters with two interlocked 5,000-w elements installed in the homes of 25 GE employees.

Mutuality of Interests . . . "Confidentially, if you want to see millions of additional electric ranges on your lines, just untangle the code and installation requirements in your areas and then support a flat cost of installation."

This remark was made by C. C. Choyce, Sears Roebuck & Co, in his talk on the common interest of utilities and mass merchandisers in the sale of electric appliances. The two are faced with the same economic problems—need for capital for business expansion, increasing costs, competition for the consumer's dollar, and the ultimate need for earnings to assure continued growth.

Adequate wiring, Choyce said, should be taken out of the conversational stage where it has been for too long. He reported that his company has field tested and is now embarked on an adequate wiring program for which he bespoke the cooperation of the utilities.

APPLIANCE SALES PROBLEMS get some serious consideration from Robert C. Hienton, Cleveland Electric Illuminating Co vice president; and George T. Bogard, General Electric Co

RESIDENTIAL SALES section chairman, G. L. Lahodny, Detroit Edison, with A. J. Bazely, Cleveland El; D. C. Slipher, National Assoc of Home Builders; M. E. Skinner, Union Electric

Hot and Cold . . . The weather presents an everlasting challenge to utility sales departments to build mutually compensating loads so as to improve load factor and earnings. So spoke M. E. Skinner, Union Electric Co, in his paper on electric space heating and air conditioning.

Summer loads on the Union Electric system are growing faster than winter loads. Studies indicate that temperature rises above 72 deg F cause increases in daily output of 130,000 kwhr per degree. In the winter drops from 60 deg F cause output changes of 20,000 kwhr per degree. Averages of monthly peak load and output increases over a seven-year period show that the summer load and output is growing 1.2 times as fast as the winter load.

Consideration of these facts led Union Electric to the decision actively to promote space heating as an offset to the increasing summer load of air cooling. First step in this promotion was compilation of a "Guide to the Use of Electricity for Space Heating in Homes, Factories, and Commercial and Farm Buildings." This "Guide" is used for information of prospective heating customers, company employees, the local electrical and heating trade, and as a source of advertising copy. The company is considering a budget billing plan which will spread out the customer's cost for electric heating.

Builders Look at Wiring . . . The electrical industry, said D. C. Slipher,

APPARATUS SERVICE SHOPS

Atlanta, Ga.
Baltimore 30, Md.
Boston, Mass.
Buffalo 11, N. Y.
Charleston 28, W. Va.
Charlotte, N. C.
Chicago 80, Ill.
Cincinnati 2, Ohio
Cleveland 4, Ohio
Columbus 15, Ohio
Dallas 9, Texas
Denver 5, Colo.
Detroit 2, Mich.
Houston 20, Texas
Johnstown, Pa.
Kansas City 8, Mo.
Los Angeles 1, Cal.
Milwaukee 3, Wis.
Minneapolis 12, Minn.
New York 14, N. Y.
Philadelphia 23, Pa.
Pittsburgh 6, Pa.
Portland 18, Ore.
Richmond 24, Va.
St. Louis 10, Mo.
Salt Lake City 4, Utah
San Francisco 3, Cal.
Seattle 4, Wash.
Toledo 4, Ohio
York, Pa.
Youngstown 5, Ohio

DISTRIBUTION TRANSFORMERS

different from others because.....

....Nationwide service facilities *keep your transformers "on the line"... provide day and night emergency or quick reconditioning service*

Whether a sudden storm brings chaos to your system, or repair work piles up . . . here's the simple, easy way to get your inactive transformers of any make back "on the line" . . . faster.

NATIONWIDE SERVICE FACILITIES, through General Electric service shops, are as near as your telephone (see list of cities at left). Burned out core-and-coils can be replaced, or your 1½- and 3-kva transformers can be up-rated to 3 or 5 kva, or in some cases 7½ or 10 kva. Special equipment, genuine factory parts, and trained personnel assure prompt service and top performance.

REMEMBER... all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information on distribution transformers, either unit-type or conventional, contact your nearest G-E sales office, agent or distributor, or write to General Electric Company, Section 431-10, Schenectady 5, New York.

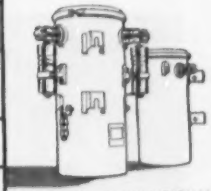
You can put your confidence in—

GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE

(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	YES	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
One-piece cover band	YES	NO	NO	NO	NO	YES
Terminals designed for both copper and aluminum conductors	YES	NO	NO	NO	NO	NO
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	YES



UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"

DEVELOPING COMMERCIAL LOADS was discussed by Lee E. Tayler, Detroit Edison Co; Ben D. Painter, Appalachian Electric Power Co; and R. I. Bull, Ohio Power Co

National Association of Home Builders, can be most effective in promoting adequate wiring if it directs most of its effort towards appraisers in general, lending institutions of all kinds, and FHA and VA in particular. As matters are now, the builder must add to the down payment any cost increase for adequate wiring. He does not like that because it disadvantages him in competition for sales.

Also the electrical industry can greatly improve its relations with home builders by aggressively policing itself in regard to "umbrellas" in local codes that cause higher wiring costs than are necessary and add nothing to adequacy or performance or value.

The Utility Job in Appliance Sales . . . More people, more families, more people moving about, more money, more new homes, more kinds of appliances add up to a continually larger market for electrical appliances, said Roger Bolin, Westinghouse Electric Corp. And, he continued, there is plenty of manufacturing capacity to make them. Production capacity has increased 65% since 1949.

To effect a matching-up of potential market with production capacity will require selling—selling adequate wiring so that new millions of appliances can be used and selling appliances and the use of them. Selling the appliances as products is the job of the manufacturer. He must sell them, sell them hard, if he is to survive. Selling the use of appliances is the job of the utility because it is the use of them that consumes kilowatt-hours.

"Beauty-Plus" Portable Lamps . . . D. E. Bootes, Dayton Power & Light Co, chairman of the task committee in charge of the project, reported on the new portable lamp program that will be launched this summer. The program will be carried on in the name of the "Beauty-Plus" Lamp Council. The lamps promoted will conform to definite specifications of performance and will bear identifying tags. Promotional materials—window streamers, point-of-sale display cards, leaflets, car cards, an advertising manual, and a mat service will be ready for the sales push in the fall after the products have been given a strong send-off in the summer lamp shows in Chicago and New York.

DISCUSSING HEAT PUMPS are H. M. Brundage and R. W. Johnson, both of General Electric; J. L. Davidson (standing), Savannah Electric & Power Co; T. D. Fulford, Virginia Electric & Power

Farm Section

Need for Selling . . . Opening the session of the Farm Section, E. D. Smith, Dayton Power & Light Co, section chairman, laid it on the line that farm electrification must be sold.

It is a simple axiom, he said, that a prosperous farmer is the best prospect for all goods and services. Promotion of electrical farm production equipment helps increase farm income thus building markets for more such equipment and for appliances that raise the farmer's standard of living.

A Prosperous Agriculture . . . Farm earnings and use of electricity go forward together, said Bud Moss, Georgia Power Co, introducing a panel discussion of "The Farm Development Team," rural youth and improvement of agricultural operations. As farmers use more electricity to do farm work, they earn more money; as they earn more money, they use more electricity.

Supporting this thesis, he cited figures showing that farm electricity use multiplied five times in ten years following connection and high-income farms using 16 times as much as low-income ones.

Agricultural Development . . . How does effort towards better farming methods, improvement in land use, production of crops and animals new in the local scene, greater agricutural prosperity generally, result in benefit to the utility? H. O. Roberts, Central Power & Light Co, asked this question and answered it in specific terms.

Promotion of pasture improvement is paying off for the Georgia Power Co. In five years 549,080 acres of pasture have been improved with resulting large increase in livestock and poultry production conservatively estimated at $80 million. This, with attendant development of local processing plants is obviously a building of energy sales. Its program of artificial insemination of cattle is benefiting Monongahela Power Co which, by the increasing use of electricity by dairy farmers, is getting its share of a

$15-million rise in annual milk production.

Referring to the work of his own company, Roberts told of research on forage crops for land made idle by cotton crop allocation, of an underground water survey that saved thousands of acres of crops, of development of a farm-size dryer which made possible the replacement of row crops with livestock production.

12,600 Salesmen, 50 Sales Branches . . . These, said J. C. Cahill, Detroit Edison Co, are the nation's county agricultural agents, 4-H Club agents, home demonstration agents, and vocational agriculture teachers. The sales branches are the land grant colleges. These people and institutions are working to improve farm living and to increase farm production and profits. They recognize the value of electricity in farm prosperity and are ready and willing to cooperate with the industry towards that end. But, asked Cahill, are the utilities taking full advantage of the opportunity for teamwork?

Dealers Needed on Selling Team . . . No matter what is accomplished in agricultural research, nor how well the results of it are made known to the farmers of America, little progress will be made in farm electrification unless dealers sell the necessary new equipment and devices to the farmer. This, said L. H. Hammond, New York State Electric & Gas Corp, will require that the dealer be backed up by the electrical manufacturer and distributor, they teaching and inspiring him to sell.

Rural Youth . . . Farm electrification is a job for youth, and it is the responsibility of those promoting it to show rural youth all the uses of electricity on the farm and in the home. This is best done, stated A. H. Gray, Jr, Southwestern Gas & Electric Co, by working with 4-H Clubs, Future Farmers of America, Future Homemakers of America, and other groups in their programs and projects, in all of which electricity can enter in some way or other.

Commercial Sales Section

Heat Pump in Commercial Application . . . Ohio Power Co regards the heat pump as a practical device, proven in use, economical for the customer, and profitable to the utility, said R. I. Bull. Many people feel that the heat pump is still an experiment, he remarked. This is just not true. If any customer wants one, there is no reason for him to put off installation. And the idea of high first cost is wrong, too. If the job is figured on the basis of annual owning cost plus the benefits of controlled indoor climate, the heat pump is competitive or better than competitive wih fuel heating.

One of the most interesting aspects of heat pump promotion is found in dealing with architects, consulting engineers, and other designers. With them it is something like eating oysters for the first time—after the first one goes down, the rest are no problem. There is quite a contrast between their attitude towards the first heat pumps they specify and their enthusiasm for subsequent installations.

Growth Problems in Air Conditioning . . . The phenomenally rapid increase in public acceptance of air conditioning in recent years emphasizes problems in electricity supply. George R. Jones, Jr, Air Conditioning and Refrigeration Institute, stated them as inadequate wiring, fast growth of load, and power factor. He pointed out that while the air conditioning industry is cognizant of these problems and is anxious to do its part towards their solution, the utilities must accept the fact that air conditioning is only a contributor to, not the sole cause of, the problems.

Inadequate wiring was a problem for years before the room air conditioner came on the scene. To keep up with load growth—10 million new customers in the six years just past, 20-year increase in energy sales from 100 billion to 350 billion kwhr—is the job of the utilities, but success in it is obviously of vital concern to the air conditioning industry. As to power factor, there is urgent need for complete and mutual understanding of the problems it poses for the air conditioning manufacturer as well as for the utility.

Selling Commercial Cooking . . . His hearers were edified and instructed by the detailed description of a small company's commercial cooking program presented by G. A. Weatherton, Kentucky & West Virginia Power Co, but the real meat of his paper was the questions asked at the end of it:

"Are you losing business by not merchandising commercial cooking equipment? How long can you compete with gas at present costs of equipment and installation? Does your customer get proper service on his equipment from you, the dealer, the distributor, the manufacturer? Do your other employees know enough about commercial cooking to recognize a prospect and pass his name on to your sales people?

Reasoning for Net Return . . . Load research data are available for rational definition of selective selling in residential and industrial electric service. But they are relatively meager and insufficient for determination of directions of selling effort among commercial customers. "We don't have enough information," said Edwin Vennard, Middle West Service Co, "to enable us to design a commercial sales program scientifically." He advised formation of a committee in the EEI Commercial Section to encourage commercial load research, that the present AEIC load research committee be urged to increased effort in the commercial service field, and that more medium-sized and small utilities over the country engage in such research.

New Look at Commercial Lighting . . . Reporting for the Commercial Lighting Committee, Albert W. Smith, Ebasco Services, Inc, showed a number of daily load charts of different utilities and told how selective selling of commercial lighting could improve the shapes of the curves. This kind of lighting load is extremely various with the natures of businesses concerned. So that the utility can sell those lighting loads that will have best effect in improving system load factor, it is necessary that diligent study be made of the different kinds of customer businesses and of the ways they are operated.

Commercial Cooking Can Be Sold . . . How the Appalachian Electric Power Co proved that theorem in an area of low cost natural gas was related by its sales supervisor, B. D. Painter. In 1948 sale of commercial cooking load amounted to 5,200 kw connected. Each year since, volume has climbed, topping 14,000 kw in 1953. The company has four commercial cooking specialists working with 23 "all-service" commercial and industrial sales-

SCANNING AWARD ENTRIES are R. A. Scholl and H. A. Millbern, Public Service of Indiana; and D. W. Runquist, St. Joseph L&P Co

AT HOME SERVICE CONFERENCE are Don Julien, Foster & Davies; Myrtle Fahsbender, Westinghouse; Jan Reynolds, Sylvania Electric

men. Sales in 1952 were analyzed as to kinds of customers. In that year the proportions of the 13,935 kw sold were: 50% to restaurants, cafeterias, and short order places; 15% to hospitals and institutions, 3% to hotels, 32% to schools, colleges, and churches. Sales promotion is largely by competitive campaigns.

Industrial Sales Section

Heat Pump in Industry . . . For converting waste or unused natural heat into useful form, the heat pump is inherently fitted, said P. W. Emler, American Gas & Electric Service Corp. In some industrial operations simultaneous requirements of heating and cooling can easily be met by the heat pump. Exceptionally high coefficients of performance can often be realized from heat sources available in manufacturing operations such as paper making, food processing, textiles, etc. In textiles large quantities of warm, not hot, water are sometimes required for washing and rinsing. This could be supplied from process waste discharge, well water, air or, in summer, from comfort cooling of work areas.

Selling Industrial Lighting . . . The trend of the curve of this load will be in direct relation to the effort put into the sale and promotion of it, asserted C. C. Shotwell, Philadelphia Electric Co. There is no reason to believe that the 50, 75, 100 and over foot-candle levels which have been accepted for specialized operations cannot be sold for general industrial application.

As an example of the importance of lighting in building additional load with existing industrial customers, Shotwell cited figures from a check of 15 contracts picked at random. The total new demand of the 15 was 2,218 kw, of which 52.8% was lighting. Of the estimated added energy use, 71.8% was for lighting. Of the estimated revenue increase, 63.6% came from lighting. This shows, he said, how load can be built in existing plants.

Metal Sheath Heaters . . . Utility revenue of $626 million is estimated by J. H. Ahrens, Hartford Electric Light Co, as coming from use of metal sheath heaters in 1962. This is about four times the 1950 revenue from this source and is based on an estimated rise from 6 million to 21 million kw in connected load of these versatile units on utility systems.

The range of metal sheath heater applications covers practically all industrial processes. Ahrens listed 32 applications in the surface heating of metals, 30 in liquid heating, 19 in heating and melting of compounds, 8 in soft metal melting, 6 in salt baths, 12 in radiant heating, and 64 in air heating for drying, human comfort and miscellaneous purposes—171 applications in all.

Future Industrial Markets . . . More than half of American industry's most basic production equipment—machine tools and metal-forming equipment—is over age. New technologies have speeded up at a tremendous rate the obsolescence of many tools and processes. This is the main reason, said J. H. Coates, Ebasco Services, why modernization of industrial production facilities offers the largest future market for sale of electricity. To increase output to meet the requirements of a steadily rising level of American living, it is estimated that industry will have to increase its use of electricity by more than 50%.

Best prospects for modernization and consequent greatly enlarged use of electricity in the next few years are the automotive and electrical machinery industries. Following in order come food, petroleum, transportation, machinery, textiles, "other manufacturing" (non-ferrous metals, building materials, containers, paper, rubber, furniture, and apparel), chemicals, and steel.

Selling the Future Market . . . G. W. Schweers, Allis-Chalmers Manufacturing Co, summed up his talk in five points:

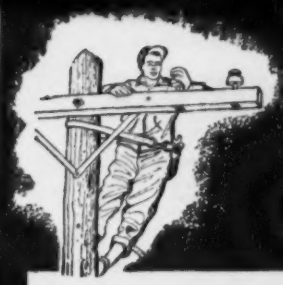
1. It is a fact that we are facing a future of vast change.

2. Fundamental economic forces will influence this future, but there is still a wide band of possibilities in our hands.

3. As individuals in power and machinery sales, we must accept our important responsibilities in shaping the future.

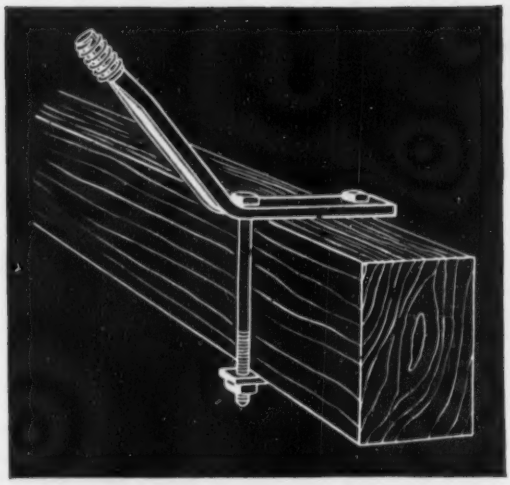
4. We must seek out the minor and unspectacular opportunities for service which, taken together, spell continued progress.

5. Power and machinery sales must work together in closest possible liason to demonstrate to their mutual customers the need for constant progress through better power utilization.



LINE CONSTRUCTION BLUEPRINTS

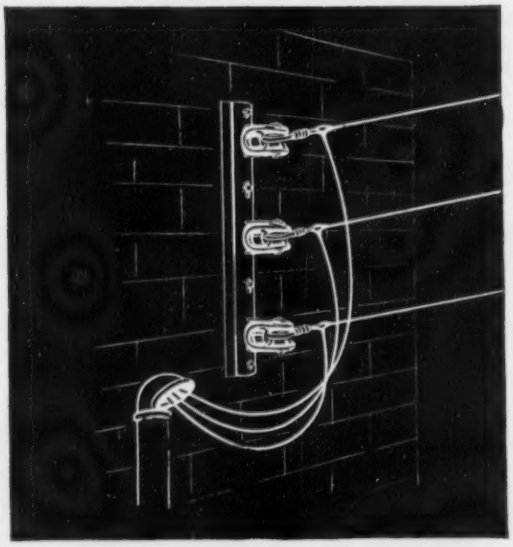
HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.



L-M TERMINAL BRACKET for Crossarm Mounting

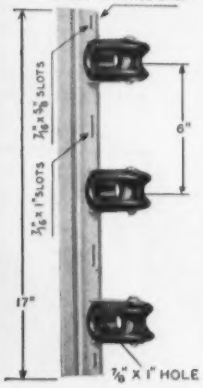
Cat. No. 311002A1

Made of 1½" x ½" x ⅛" channel steel, hot dip galvanized. Machine bolts and clamping plates are included. Fits crossarms from 3¼" x 4¼" to 4" x 5". One-inch lead head for insulators.

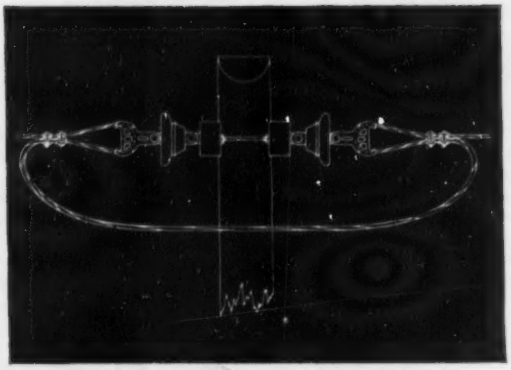


L-M SERVICE RACK

Cat. No. RA-144

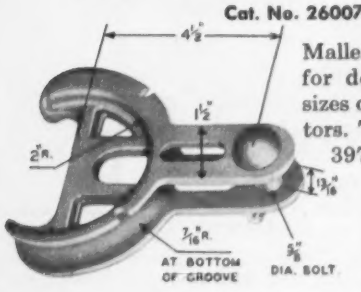


A neat-appearing service rack specially designed for mounting on building walls. Extended flared back provides wide, flat mounting surface. Made of 12-gauge pressed steel channel, with large slots for mounting screws. Dry process porcelain insulators have ⅞" x 1" holes, providing ample space for tying conductors.



L-M DEAD END THIMBLE CLEVIS

Cat. No. 260073A1



Malleable iron thimble clevis for dead-ending the larger sizes of all-aluminum conductors. Takes conductors up to 397,500 CM, 19 strand, all-aluminum with armor tape (0.824" outside diameter). Ultimate strength of clevis—12,000 pounds.

Do You Have a Line Construction Problem?

These are just a few of thousands of L-M Line Construction Specialties. If you have a line construction problem, let us help you. We may have items right in stock that will help solve your problem. Ask the L-M Field Engineer—or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL *Line Construction Materials*

Why L-M Round-Wound Transformers Have Such High Short-Circuit Strength

by **JAMES G. EVERHART**
Chief Engineer
Transformer Division
Line Material Company

One of the desirable characteristics of L-M Round-Wound transformers is their exceptionally high short-circuit strength. Partly this is inherent in the way we wind round coils on a wound core. But further, this strength arises from the exceptionally good mechanical design.

Effects of Short Circuits

Short circuits exert two forces—radial and axial. Under radial forces, rectangular coils tend to assume a round shape. Being already round, the coils on Round-Wound transformers resist these radial forces much better than do rectangular coils. (Figs. 1 and 2).

Axial forces tend to telescope the windings. Although failure is progressive, it can occur almost instantaneously. If the coil starts to telescope, the electrical centers of the coils are abnormally displaced. This results in a greater axial component which increases the force and the movement, leading to complete failure. (Figs. 3 and 4).

In larger transformers the mechanical forces involved can amount to thousands of pounds. Therefore in Round-Wound transformers we pay special attention to providing a mechanical structure sufficiently strong to support and hold the coils in position in the assembly.

This structure requires a rigid steel frame, firmly tied together vertically (Fig. 5), and properly designed blocking (Fig. 6). Even leads must be strongly clamped (Fig. 7), since great mechanical forces may exist between adjacent leads.

Varnish Selection

Correct application of the proper varnish provides a bond between layers of insulating paper and coil sections which contributes to short-circuit strength. We have developed a variety of tests for varnish, including a mechanical test of bonding strength. (Fig. 8). These tests enable us to select those few varnishes which combine the highest mechanical and electrical strength with other desirable qualifications.

The overall result of design, construction, selection of materials, and careful manufacture has given L-M Round-Wounds unusually high short-circuit strength, which contributes to an extremely low rate of failure.

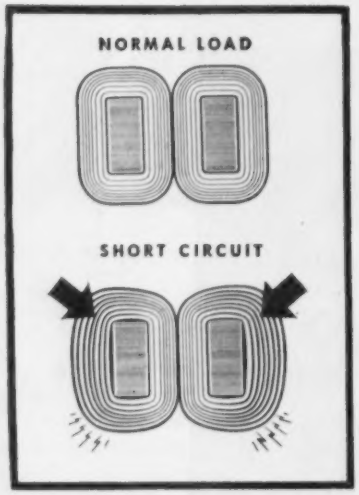


FIG. 1. Radial forces existing under short-circuit currents make rectangular coils tend to become round. The forces may be violent enough to damage insulation, or may completely destroy the coils.

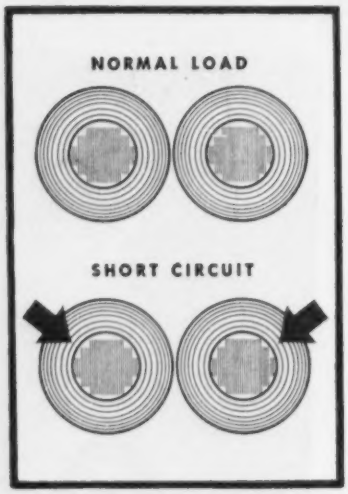


FIG. 2. Since the coils of Round-Wound transformers are already round, short-circuit radial forces cause no distortion. Thus Round-Wounds have inherently higher short-circuit strength.

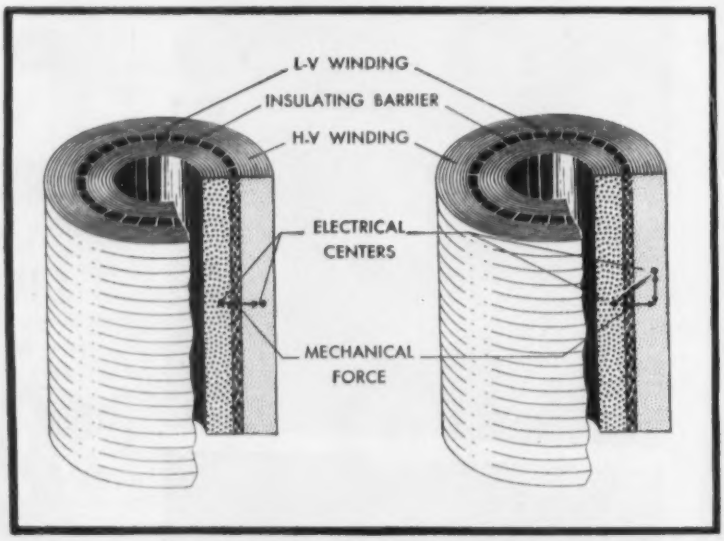


FIG. 3. Diagrammatic vertical section of coil showing primary and secondary electrical centers on the same horizontal plane. Under short circuits, all forces are radial and windings tend to repel each other in a horizontal plane. But even though coils can be designed with the electrical centers on the same plane, manufacturing tolerances cause some variations; and tap changer operations will cause some unbalance.

FIG. 4. With electrical centers displaced vertically, the force between the centers has both radial and axial (vertical) components. Axial forces cause the windings to telescope and separate vertically. Any displacement increases the vertical force component between them, which progressively compounds to complete destruction of the coils. The rigid construction of Round-Wound transformers prevents the slightest movement.

LINE MATERIAL Transformers

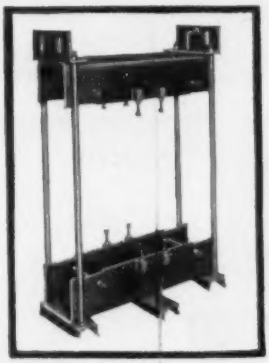


FIG. 5. Heavy steel frame provides a rugged mechanical structure that is firmly tied together vertically. It is sufficiently strong to support and hold coils in position in the assembly.

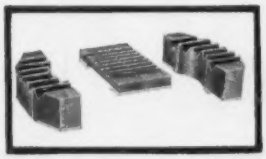


FIG. 6. Sturdy kiln-dried, oil-impregnated, shaped maple blocks give maximum contact and support to coil-edge surfaces. These are assembled and clamped so that they cannot move out of position under short-circuit forces.

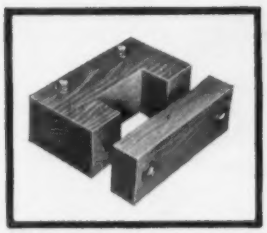


FIG. 7. Under short-circuit conditions, great mechanical forces exist between adjacent leads—especially in large transformers. These leads are strongly clamped so they cannot be harmfully displaced.

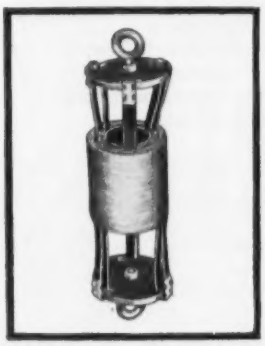


FIG. 8. Here is a coil impregnated with a test varnish set up for a pull test—which will determine whether the varnish has adequate bonding strength. This is just one of the tests L-M has developed to select the best varnishes for Round-Wound transformers.

"Round-Wound" is a Line Material Company trademark

Compare the Things That Count

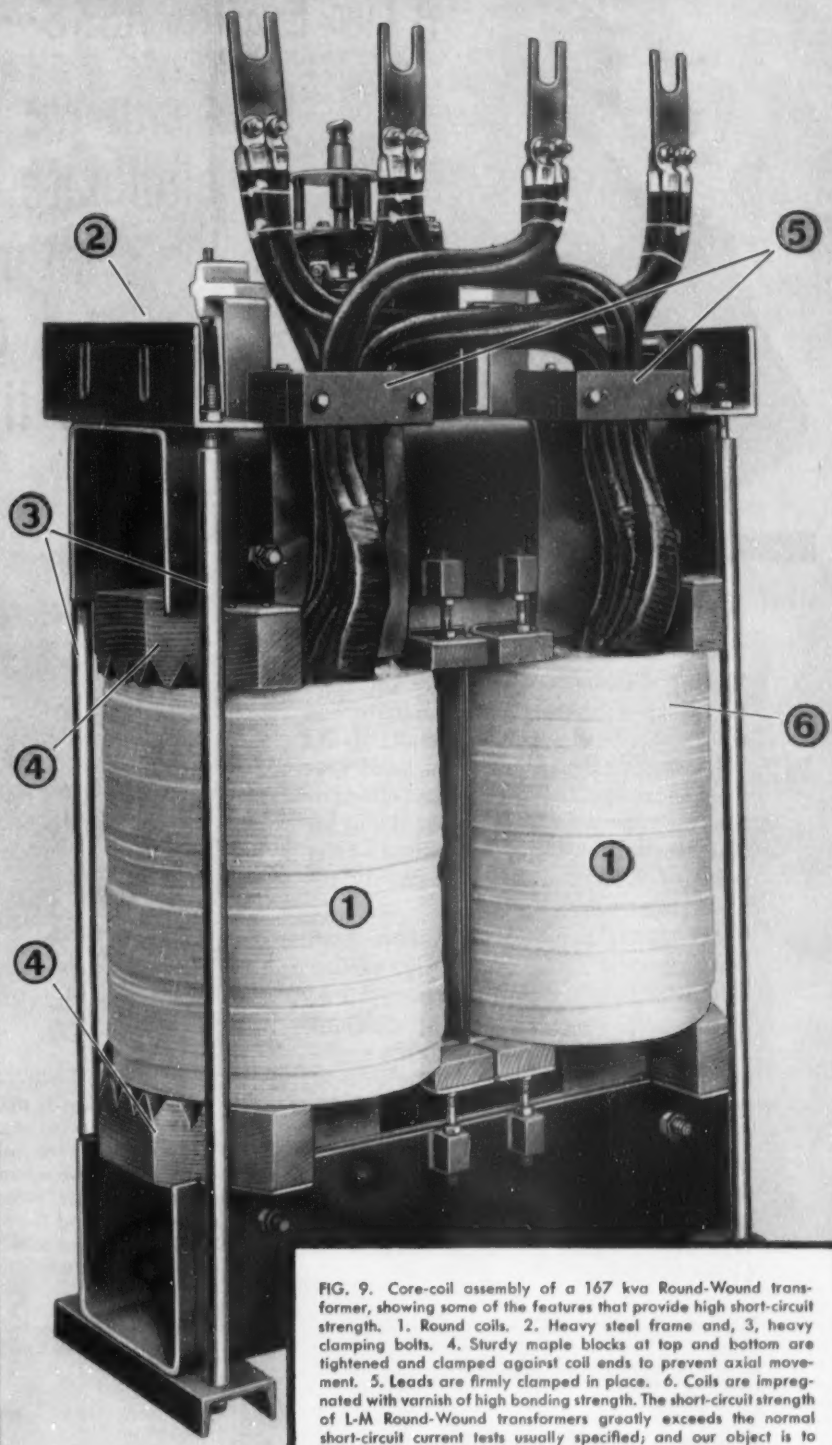


FIG. 9. Core-coil assembly of a 167 kva Round-Wound transformer, showing some of the features that provide high short-circuit strength. 1. Round coils. 2. Heavy steel frame and, 3, heavy clamping bolts. 4. Sturdy maple blocks at top and bottom are tightened and clamped against coil ends to prevent axial movement. 5. Leads are firmly clamped in place. 6. Coils are impregnated with varnish of high bonding strength. The short-circuit strength of L-M Round-Wound transformers greatly exceeds the normal short-circuit current tests usually specified; and our object is to build transformers that will withstand dead short-circuit currents.

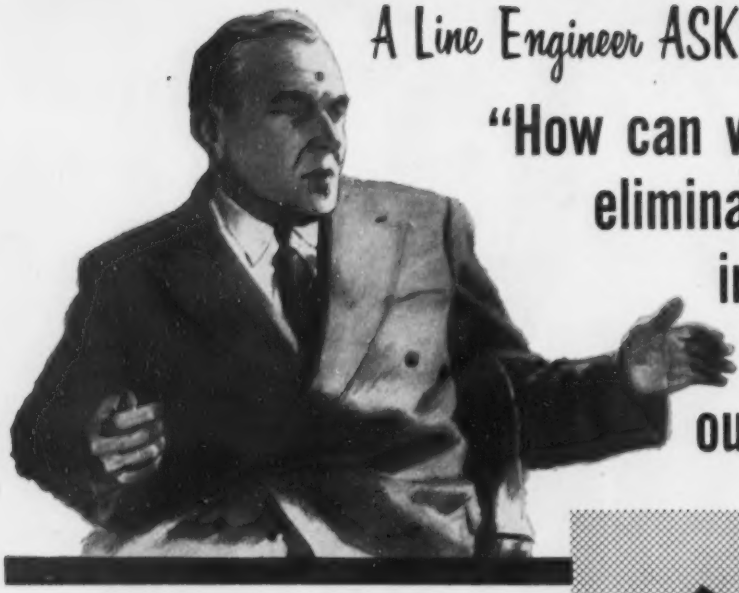
Get Complete Information About L-M Round-Wound Transformers

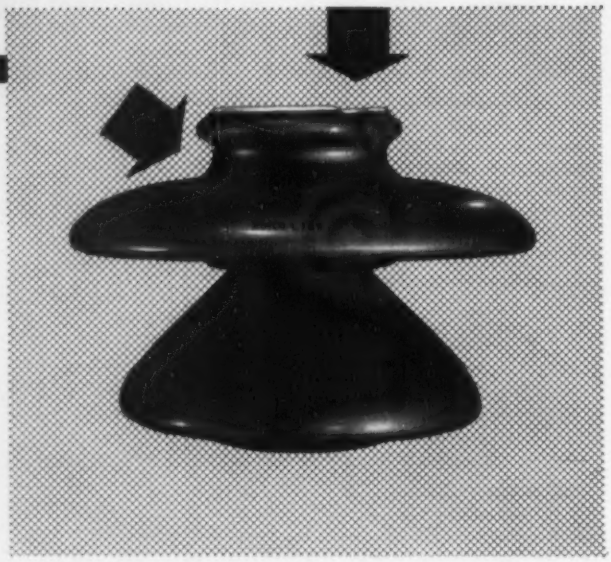
We'd appreciate an opportunity to give you full information about the many desirable characteristics of these outstanding transformers. We'd like you to compare them with others—"Compare the things that count!" Ask the L-M Field Engineer for information; or write for new Bulletin DT-1 to Line Material Co., Transformer Div., Zanesville, Ohio (a McGraw Electric Company Division).

A Line Engineer ASKS—

NO. 13 IN A SERIES

"How can we eliminate television interference originating from our lines?"





HERE'S OUR ANSWER:

Surveys prove that only 10 to 15% of the TV interference complaints are traceable to utility equipment. To eliminate one source of potential trouble, install PINCO "NOCORONA" Units when you build new lines or replace standard pin type insulators on your present lines. By doing so, Radio and TV interference caused at the point of insulation is automatically reduced to *zero*.

WHAT MAKES A PINCO INSULATOR "CORONA-FREE"?

PINCO "NOCORONA" units embody all of the rugged design features of standard Pinco Pin-type Insulators, *plus* the application of a special glaze at the critical points . . . the conductor and tie wire grooves. This glaze, being conducting, forms an intimate bond between the conductor, tie wire and insulator, thus eliminating the possibility of brush discharge (Corona) from the conductor and tie wire to the insulator.

PINCO introduced its "NOCORONA" units in 1929 whereupon they immediately proved to be an effective means of eliminating interference previously caused by Corona discharge. That was twenty-four years ago! To-day, thousands of PINCO "NOCORONA" Insulators are in service from coast-to-coast insuring "interference-free" reception for millions of radio listeners and television viewers.

For complete information regarding Pinco Pin Type Insulators ("NOCORONA" and Standard Types) refer to Pinco Catalog No. 49, page 28 to 43 . . . or contact the Joslyn office in your locality.

The Porcelain Insulator Corporation
LIMA, NEW YORK

Suspension Insulators . . . Clamps and Fittings . . . Switch and Bus Insulators . . . Distribution and High Voltage Pin Types . . . Guy and Tree Insulators . . . Special Porcelain.

NEWS ABOUT PEOPLE

EDMOND W. HEBEL

DAVID P. PARDEE

PS of Indiana Fills Key Posts

Hebel and Pardee are appointed executive vice presidents. Conway, Trainor, and McMurray are elected VP's

Realignment of executive functions by Public Service Co of Indiana, Inc, has resulted in the election of two executive vice presidents and three vice presidents.

Edmond W. Hebel and David P. Pardee are the new executive vice presidents. Hebel will be responsible for operation, engineering and sales and Pardee, who was elevated from vice president, will be in charge of financing, accounting, and legal activities. Paul G. Jasper was made general counsel to succeed Hebel.

3 New VP's . . . Earl H. Conway, comptroller, was elected vice president and comptroller. Joseph J. Trainor, chief engineer, was named vice president in charge of engineering, and Robert McMurray, general sales manager, was promoted to vice president in charge of sales.

Hebel became associated with Public Service in 1948 as general counsel. Before this he was a partner in the law firm of Evans & Hebel, Indianapolis, Public Service's legal counsel.

Pardee's career with the Indiana utility started in 1937. A year later he was named vice president and comptroller, advancing to vice president in 1945.

Conway went to work for Public Service in 1938, advancing that same year to assistant to the comptroller. He was made comptroller in 1945. Trainor began with the utility in 1927.

EARL H. CONWAY

JOSEPH J. TRAINOR

ROBERT McMURRAY

Prior to becoming chief engineer in 1941, he served as superintendent of electrical construction and superintendent of substation maintenance.

Since joining Public Service in 1922, McMurray has served in various sales engineering capacities. He was made assistant general sales manager in 1947 and general sales manager in 1953.

Allis-Chalmers Appoints McMullen Vice President

J. W. McMullen, general manager of the Pittsburgh Works of Allis-Chalmers Manufacturing Co, Milwaukee, has been named vice president in charge of transformer and switchgear equipment. Appointment of McMullen and formation of the transformer and switchgear department in the firm's General Machinery Division were announced by President W. A. Roberts.

J. W. McMULLEN

In his new position McMullen will be responsible for operations at the Pittsburgh Works and Boston Works and for all transformer and switchgear operations at Hawley (West Allis, Wis.) West Allis, (Wis.), and Terre Haute (Ind.) plants. He will make his headquarters at the West Allis Works.

McMullen joined the Pittsburgh Transformer Co in 1917, ten years before it was acquired by Allis-Chalmers. He was appointed assistant manager of transformer sales in 1935, becoming assistant manager of the transformer section in 1945. Two years later he was made general manager.

NPPA Elects Beasley President

Ora Beasley (left), new president of the Northwest Public Power Association, is shown conferring with Vivan Jones (center), power manager of Tacoma (Wash.) City Light, vice president and Gus Norwood, who continues as executive secretary. These new NPPA officials were elected at the association's annual convention held recently at Tacoma, Wash. The group also named as its treasurer, Edward Cooney, Cowlitz County (Longview, Wash.) PUD commissioner.

Beasley has been manager of Northern Lights, Inc, a Rural Electrification Administration co-operative at Sandpoint, Idaho, for the past four years, after previously having been in the power distribution field in the Tennessee Valley Authority area.

Elects 2 Vice Presidents

J. A. Cuneo, for the past several years general sales manager of Fairbanks, Morse & Co, Chicago, has been elected vice president in charge of sales. In another appointment, Robert B. Craig, formerly assistant to the president, was elected a vice president with headquarters in Washington, D. C. L. J. Maguire, general manager of Fairbanks, Morse St. Johnsbury (Vt.) Works, has been appointed manager of the company's new Electronics Division with offices in Davenfort, Iowa. O. S. Leslie, vice president in charge of manufacturing, was elected to the board of directors.

•

Arthur G. Mason has retired as commercial manager for Thomas & Betts Co, Elizabeth, N. J. He joined Thomas & Betts in 1935 after serving with Graybar Electric Co, where he headed wire and conduit sales.

William F. Ryan, engineering manager of Stone & Webster Engineering Corp, Boston, has been named recipient of the 1954 New England Award of the Engineering Societies of New England. Ryan will receive the award at ESNE's annual meeting slated to be held April 27 in Boston.

A. W. Peterson has retired as a vice president of Central Vermont Public Service Corp and as manager of the company's Northwestern Division at St. Albans, Vt. Peterson, who has handled the electric operations in the St. Albans area since 1907, was president of Public Electric Light Co when it was merged last year with CVPS. The utility also announced that **Maynard P. Foster,** a Pelco veteran who has been operating superintendent of CVPS's Northwestern Division since the merger, was made commercial manager of that division. **Seymour Robinson,** with CVPS since 1939, was named operating engineer for the St. Albans area.

Irving T. Bennett has been elected chairman of the board of General Cable Corp, New York. Bennett, who will continue as chief executive officer, a post he has filled since last August, succeeds D. R. G. Palmer, who is retiring after 35 years with the firm and its predecessors. Bennett joined the company in April, 1953, as a director and chairman of the executive committee.

Thomas Appointed a VP by Babcock & Wilcox Co

W. J. Thomas, general manager of the Tubular Products Division of Babcock & Wilcox Co since last August, has been appointed a vice president of the company.

Babcock & Wilcox also announced the election of Vice President Edward A. Livingstone to the board of directors. In addition, Livingstone was placed in charge of the company's Tubular Products Division.

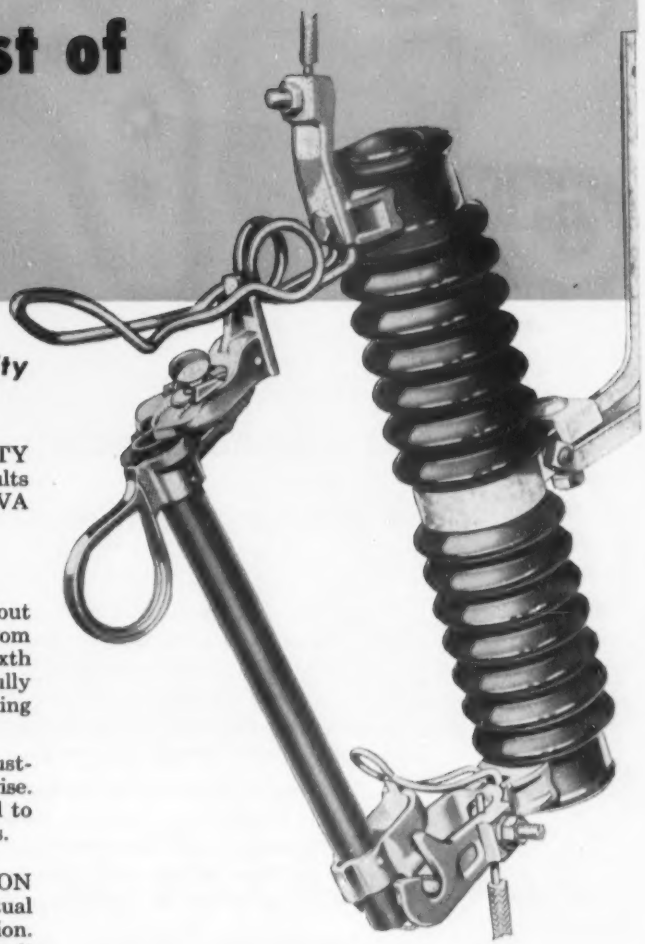
W. J. THOMAS

Thomas joined Babcock & Wilcox in 1932, first working in the Boiler Division. A year after going to the Tubular Division in 1941, he was named assistant general sales manager and general sales manager in 1948. He was appointed to the board of directors of the Tubular Products Division in 1952.

More PROOF !

QUALITY CUTOUTS PAY OFF IN LOWER MAINTENANCE

Actual Field Test of KEARNEY H-D TRIP-OUT



Demonstrates High Short Circuit Interrupting Capacity

TEST:

A standard, 100 ampere, 15 KV HEAVY DUTY TRIP-OUT* (16234-3) was subjected to faults made on the 15 KV side of a 10,000 KVA transformer.

RESULTS:

At 14.4 KV with a 20% power factor, the cutout successfully interrupted six shots ranging from 7620 to 8750 amperes, RMS. After the sixth shot, the cartridge and contacts were carefully examined and found to be in perfect working condition.

After the short circuit test, without any adjustment, the cutout was tested for temperature rise. The maximum found was 13°C, as compared to the 30°C allowed by NEMA on new cutouts.

NOTE: These reports are NOT BASED ON CALCULATION! They are the results of actual field tests at Kearney's 34.5 KV substation. Power was taken from the Union Electric circuit providing a 445,000 KVA backup.

**Taken at random from the regular production line.*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

The Mark of Quality Products

Kearney high-quality cutouts cost you less in the long run. Built to last, they have such engineered refinements as: auxiliary spring contacts for added trip-out torque, heavy fuse tubes lined with horn fibre, and cast bronze operating parts. These and other Kearney quality features are your assurance of more economical, safer and longer-lasting protection for your distribution circuits. Ask your Kearney Representative to show you the Trip-Out engineered for your load and fault conditions.

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Ave. • St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

Specify **KEARNEY Products**

For Better Construction . . . For Safer Maintenance

You needn't look far

for Honeywell instrument service

Because instruments have become such vital links in the production chain, Honeywell has developed a service organization that is the largest of its kind in the world. No matter where you may be, there's a Honeywell service man near you . . . in more than 110 service centers spotted strategically throughout the United States and Canada.

A wire or phone call to the nearest of these centers will bring help in a hurry . . . often in a matter of hours. And the service you get is expert. Honeywell men are trained, by factory schooling and field experience, in the most modern methods of keeping good instruments in peak condition.

Frequent check-ups *prevent* emergencies . . . protect your instrument investment. The economical way to do this is a Periodic Service Contract, which brings a Honeywell man to your plant at regular intervals to inspect, clean and adjust your instruments and controls. Your local Honeywell office will be glad to give you full details, and to arrange a custom-fitted contract for your requirements.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

BEFORE

AFTER

New Lights Shine on the Boardwalk

W. EARLE HAWKINS,
Senior Engineer, Atlantic City Electric Co, Atlantic City, N. J.

J. HOWARD WENNER,
Street Lighting Engineer, Westinghouse Electric Corp, Phila., Pa.

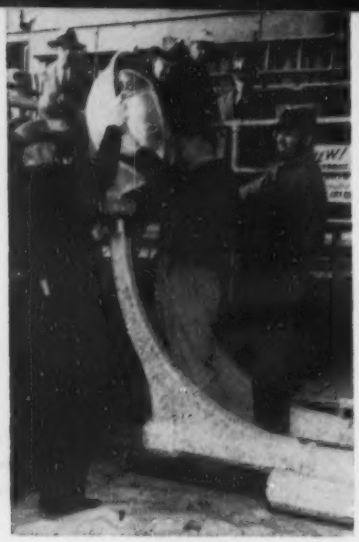
A street lighting system which is expected to be a model for many others throughout the country has been installed on Atlantic City's famed boardwalk. The installation, which is the result of several years' planning, was one of the progressive steps taken by Atlantic City to dress up for its 100th anniversary and for Light's Diamond Jubilee.

Unlike most street lighting installations it is not an assembly of equipment long used in other communities. The resort city's system marks the initial use of four "firsts." These include a new size light source in a new street lighting luminaire, mounted on a new design standard, and operated from a new ballast.

The combination of this new equipment into an integrated lighting system has improved visual comfort by its uniformity of illumination (2 ft-c). Photometric measurements along the centerline of the 60-ft-wide walk show no measurable variation.

Fluorescent mercury was selected as the logical light source as no other source affords such an abundance of light, of agreeable color, with comparable economy. The incandescent through popular usage has been accepted as the "standard" light source. But it is known to wash out blue hues. Straight mercury fails to do justice to orange or red hues. In the fluorescent mercury lamp, however, color balance is maintained by a phosphor, magnesium fluorogermanate, which fluoresces bright red under the abundant ultra-violet of the mercury arc.

In the Atlantic City installation the fluorescent mercury light source makes possible the use of a minimum number of units of maximum size consistent with correct application techniques.



Luminaire goes on . . .

Luminaire Location Problems

Oceanside arrangement was mandatory because standards support railing. Interference with valuable building fronts could not be permitted.

A luminaire had to be located at each street end where standard carried street signs. Block lengths are generally 400 ft.

Distance between centerlines of intersecting streets was divided as equally as possible. The only devintions were those required by abutting piers, pavilions, and comfort stations.

standard goes up . . .

New Developments . . . The new lamp also fulfills the project requirement for an average maintained illumination of 2 ft-c minimum. Type BH-18 has an initial rating of 33,000 lumens. Its development was concurrent with the H-18 multiple 113/120/127-v ballast.

Another development was the OV60 luminaire. This is a big brother to the familiar OV20 which was brought out in 1946. This new luminaire accommodates not only the BH-18 lamps but also the 46,000-lumen, BH-15 and the 52,000-lumen, AH-15, 1,000-w lamp sizes. With the same luminaire the boardwalk lighting level can be stepped up 40%. The increase to 3 ft-c can be accomplished by a simple change to the BH-15 lamp and ballast.

All luminaires are characterized by wide ASA-IES Type-IV distribution with maximum vertical candlepower of relatively low magnitudes (OV60-7923, OV20-5105) and at low vertical angles (OV60-60 deg, OV20-40 deg).

Equipment has been selected to withstand salt corrosion, to reduce maintenance to the minimum, and to withstand the heavy gales which strike the area at certain seasons. The system has already survived one 78-mph storm. On the luminaires there is hinged glassware. The cast housing will not corrode.

In the "Hollowspun" concrete standards air-entrained cement seals out salt while steel reinforcing wires are hot-dip galvanized as a final insurance against rust from within. Shafts are of the new "prestressed" construction for maximum density, flexibility, and strength.

The maintenance-free concrete brackets harmonize with the standard and support a festoon outlet at 17 ft height. This provision has been made because it is believed that special decorative lighting will frequently be used.

The only exposed metal parts of the standard assemblies are the ¾-in. thick cast-steel spider base, the bronze inserts for railing and street sign attachments, and the heavy wall, HD galvanized, 2-in. slip-fitter.

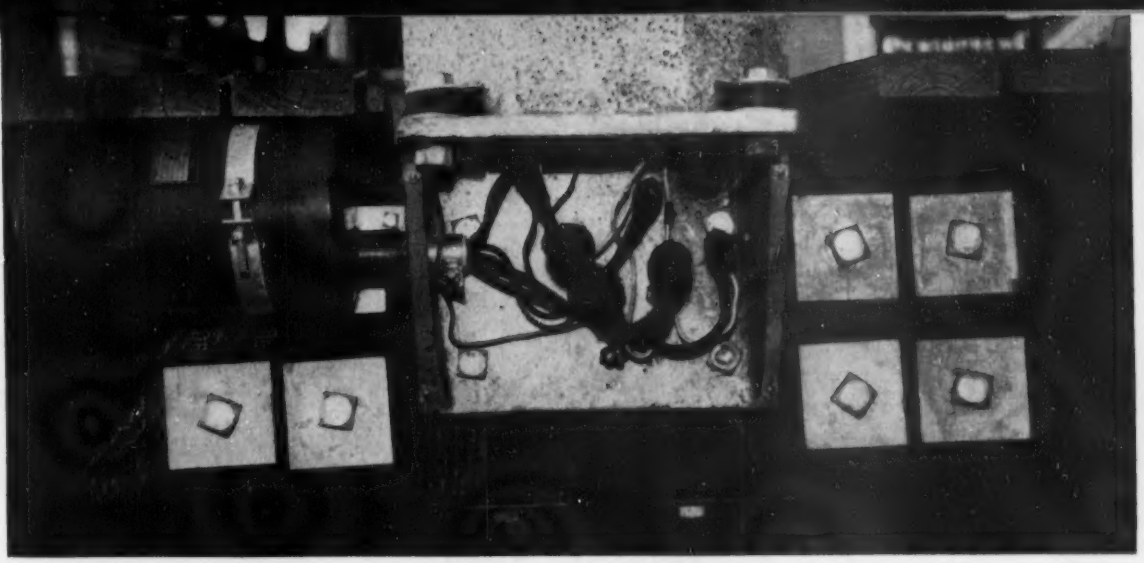
Major portion of the 123-unit lighting system is within the underground network area. It is supplied by a 3-phase, 4-wire, 120/208-v distribution system. The closest secondary supply point, either a vault or junction box, feeds the five units in each block and the relay controlling the adjoining block in the cascaded system.

Feed consists of 2-conductor, SE cable strung along the inside edge of the boardwalk's front joist. There are no cable breaks between standard splicing chambers. The spiral wrap of cable is connected to the system ground with all standards and ballast grounded to the wrap. One conductor is used as the phase wire, the other as a neutral which is grounded through a normally closed 60-amp relay. During daylight hours the relay is energized to prevent illumination of the lamps.

As daylight wanes, a photocell governs the master control of the entire system. The photocell is located on the roof of the five-story Atlantic City Electric Co headquarters building, one block from the boardwalk. Monitor action of the photocell switches a 120-v pilot wire to the first relay.

Old boardwalk lighting system has . . .

been replaced by this modern layout



Now ballast and all wiring are concealed beneath overhang of boardwalk

Project Requirements for the "New Look"

Average maintained illumination of 2 ft-c minimum—a source of 30,000 lumens initial output.

Wider spacing of standards to lessen "picket fence" effect.

Built-in provision for future increase to 3-plus ft-c without major change to the system.

Properly colored illumination of a wide pedestrian promenade on which extraneous (color correcting) lighting is available mostly from side opposite luminaires.

Rugged, non-corrosive equipment that needs a minimum of maintenance in spite of continuous exposure to salt atmosphere.

Equipment of low windage, able to withstand storms of gale or even hurricane force.

←Last bolt is tightened to finish job

Old Boardwalk Lighting Compared With the New

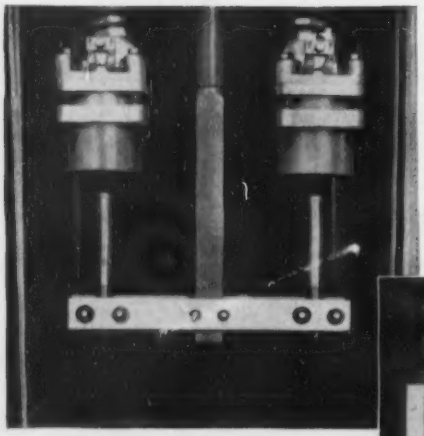
	The Old (by ASA-IES Types)		The New (by Avenue Locations)		
	Type IV Very Heavy and Heavy	Type V Heavy and Medium	N. J. to Bellevue Very Heavy	Bellevue to Morris Heavy	N. J. to Mass. Medium
Width of walk, ft	40 & 60	60	60	40	60
Luminaire	Pendant	Post-Top	OV60-IV	OV20-II [a]	OV20-II [a]
Lamp	575W	575W	BH18	JH1	JH1
Rated initial output, lumens	10,000	10,000	33,000	19,000	19,000
Mean lumens over life	9,160	9,160	26,400	15,000	15,000
Luminaire depreciation factor	0.60	0.80	0.90 [b]	0.90 [b]	0.90 [b]
Height to light center, ft	18.5	19	30	24	24
Overhang, ft	1.5	None	4.5	3	3
Linear distance, ft	6,900 [c]	2,000	6,480 [c]	1,520	900
Luminaires, no	105	35	88	20	11
Average spacing, ft	65.5	57	73.6	76	82
Total utilization factor	0.38	0.17	0.39	0.44	0.475
Horizontal avg maintained foot-candles	0.53	0.36	2.1	1.95	1.3
Average initial foot-candles	.....	.....	2.92	2.75	1.84

[a]Type IV distribution results when JH1 lamp is used.
[b]Based on 3-year experience with OV20-EH1 installation in less favorable atmospheric situation.
[c]Not including areas requiring special treatment: viz, Steel Pier, Central Pier, Convention Hall.

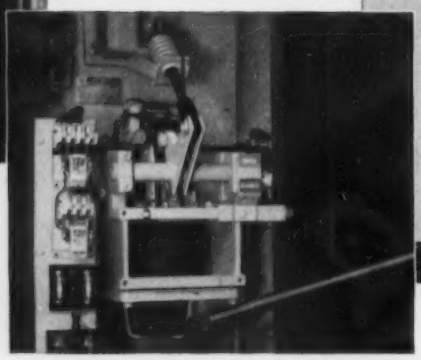
Get the breaker with these

PLUS FEATURES

Here's Increased Operating Convenience with High Safety Factor of Tank-Per-Phase Design



TULIP AND BAYONET CONTACTS are self-wiping and self-aligning. Note also, double break per pole design and time-proved *Rup-tor* interrupting device are used. Here again, Allis-Chalmers is using the same quality construction as is used on large A-C breakers.



VISIBILITY PLUS. Maintenance closing device is side operated. Man closing breaker can observe contacts and man working on them. In addition, external position indicator easily visible at a distance from front or side. Inside position indicator also provided.

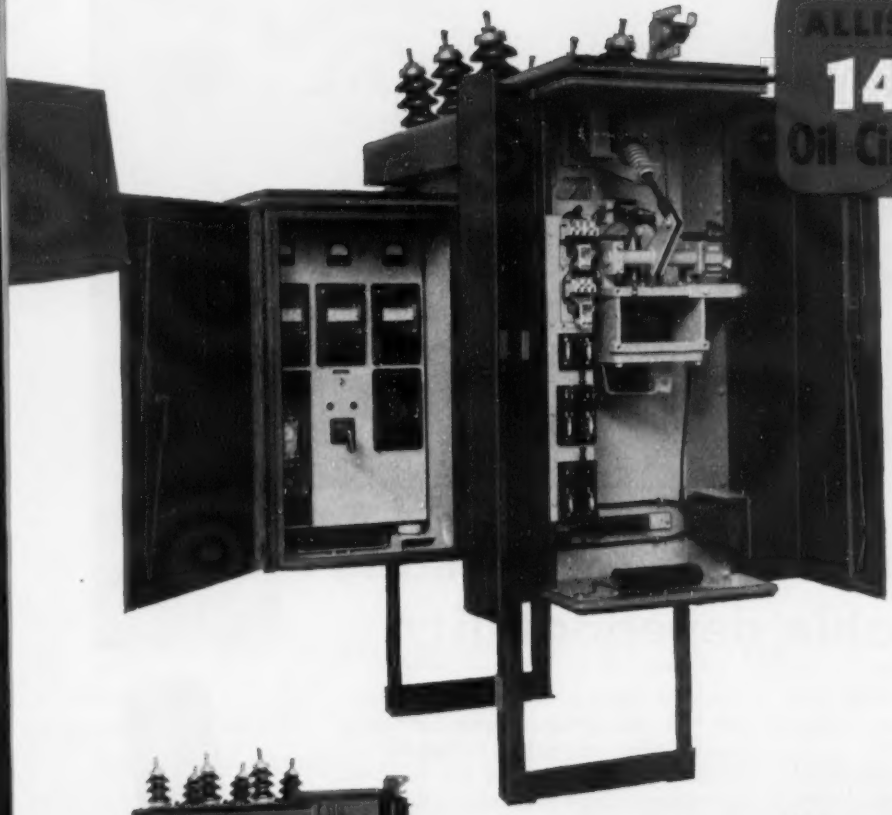
NO BURIED LEADS. Simply remove 3 pins and bottom of fabricated wiring duct to expose bushing current transformer leads. No conduits, pipes, fittings to remove. This is just one more well-thought-out design feature that makes this the outstanding distribution type breaker today.

A-C ALLIS-CHALMERS

ALLIS-

ALLIS-CHALMERS

14.4-Kv Oil Circuit Breakers

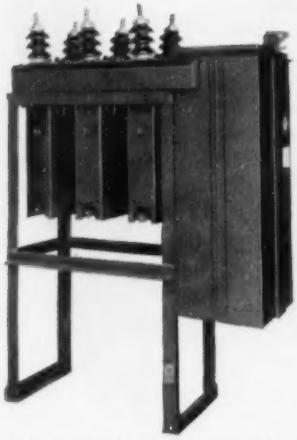


NO FALSE OPERATION OF RELAYS. Operate the breaker—slam the door — or let the wind slam it and relays will not operate accidentally. Relay panel is in separate cabinet from operating mechanism and is shock-mounted at 4 points. No hinge wiring either! Separate door in rear of cabinet provides access to back of relays.

ROOMY OPERATOR CABINET — Side hinging of L-shaped doors allows side as well as front access to operator cabinet. Only 7 inches of clearance needed in front of cabinet to open doors. Operator is high speed solenoid type — mechanically and electrically trip-free. Linkage is basically same as used on large A-C breakers.

BREAKER RATINGS (8-Cycle Standard Interrupting Time)

Type	Rated Kv	Rated Amps	INTERRUPTING RATING			Weight of Breaker With Oil (lbs.)
			RMS TOTAL AMPERES		Kva	
			At Rated Volts	Maximum Rating		
OZ-15-100	14.4	600	4,000	15,000	100,000	2,350
OZ-15-250	14.4	600	10,000	25,000	250,000	2,370
OZ-15-250	14.4	1200	10,000	25,000	250,000	2,470
OZ-23-250	23	600	6,300	12,000	250,000	2,370

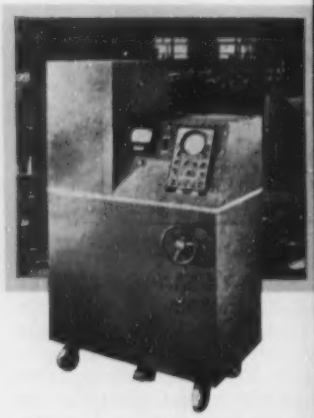


TANK-PER-PHASE construction—as used in large breakers — effectively isolates phases and eliminates possibility of internal phase-to-phase flashover.

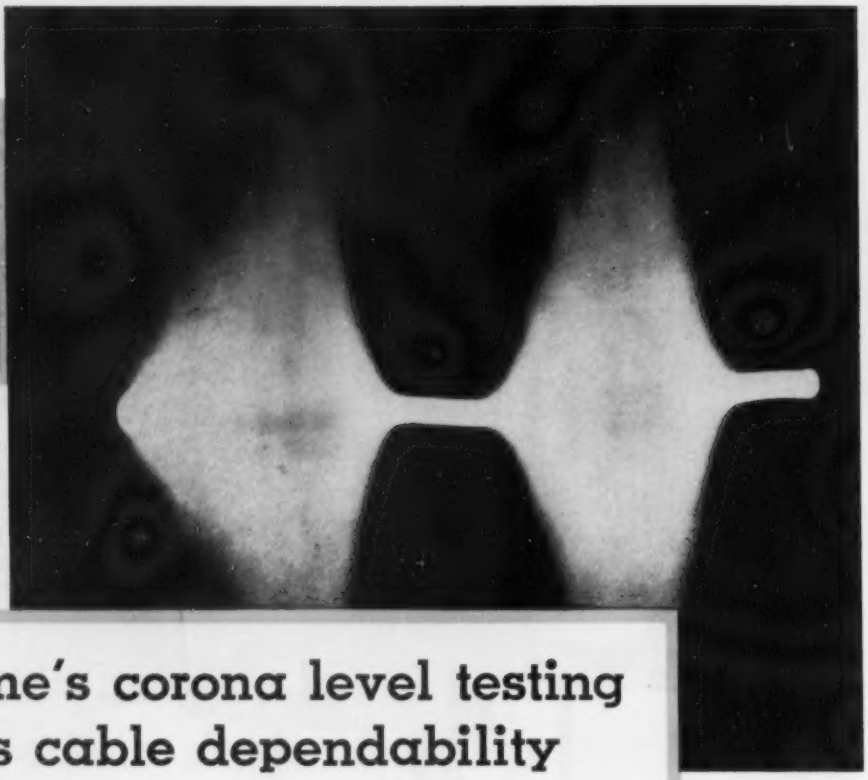
GET COMPLETE INFORMATION.
Call your nearby A-C district office, or write
Allis-Chalmers, Milwaukee 1, Wisconsin

Ruptor is an Allis-Chalmers trademark. A-4253

CHALMERS



Specially designed ionization detector for routine factory use measures corona level of all-insulated cables rated at 3000 volts or over.



Why Rome's corona level testing assures cable dependability

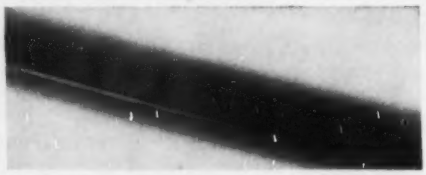
The picture above means trouble. It is an oscilloscope trace of internal ionization in an insulated cable.

Ionization is caused by the electrical break-down of air in pockets within the insulation, or between the insulation and conductor or shield. Should this ionization occur at a value below the operating voltage of the cable, several destructive electrical effects may occur such as possible ozone cutting, reduced dielectric strength, and a substantial increase in dielectric losses. Any of these hazards could result in early failure or reduce the efficient performance life of the cable.

Ionization is particularly dangerous because it cannot be detected by the ordinary visual, physical and electrical testing methods usually applied to cable.

So, to prevent guesswork, to assure you of maximum protection against ionization, *every foot of Rome insulated cable, rated at 3000 volts or over, is thoroughly tested by a specially designed ionization detector.* This instrument accurately measures the corona level of the entire cable. Unless the ionization voltage exceeds the intended operating voltage of the cable, the cable is rejected.

This is one more extra step in Rome Cable's standard manufacturing procedure that assures dependability. This completely new *NONDESTRUCTIVE* method of testing was developed by Rome Cable engineers and was first described in AIEE paper 48-198, "The Measurement and Investigation of Ionization Level of Rubber Insulated Cables," presented in August, 1948.



This X-ray reveals loose insulation—a major cause of ionization.

500,000 CM stranded single conductor RoZone insulated, shielded, RoPrene sheathed power cable . . . 15,000 volts, grounded neutral.

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

ROME CABLE CORPORATION, Dept. EN-4, Rome, N. Y.
Please send me literature on ionization testing.....
Rome Power and Control Cable Catalog.....
Name.....
Company.....
Address.....
City..... Zone..... State.....

SPEAKERS and MVEA officials are pictured before opening of Engineering and Operating conference general session. They are (l to r) D. W. Morgan, Westinghouse; I. D. Pettegrew, MVEA director; C. M. Lytle, Kansas City Power & Light, MVEA Engineering and Operating Section chairman; and W. B. Gesell, Oklahoma Gas & Electric Co, president of MVEA

Atomic Power as Fuel Saver...

... discussed by D. W. R. Morgan, Westinghouse, at engineering and operating conference of Missouri Valley Electric Association

Depletion of the world's fuel supplies is a factor which should receive major consideration in the development of atomic power, D. W. R. Morgan, Westinghouse Electric Corp vice president, told general session of 25th annual engineering and operating conference of Missouri Valley Electric Association. Conference was held April 7-9 at Kansas City.

Citing the rapid growth in fuel requirements, Morgan related them to supplies of conventional fuels and said that present fuel resources are insufficient to fill the need. He showed what might be accomplished by supplementing these with atomic energy sources.

Prime Movers . . . Utmost in reliability and speed of response in case of system disturbances were major objectives in the development of a new type of generator exciter, said W. L. Ringland and H. W. Cory, Allis-Chalmers Manufacturing Co. The new exciter has no commutator, no slip rings, and no windings on the rotor. Generation is at 360 cycles and this is converted to direct current by a selenium rectifier.

Economic scheduling of generation depends not only on plant economies but also on transmission losses, said A. F. Glimn, General Electric Co. Solutions of the problems involved have been made practical by computing machines and appreciable savings can be effected, he said.

Air Conditioning . . . D. K. Blake, GE, said that in order for utilities to serve the air conditioning load they must take steps to have capacitors installed in the air conditioning units. He urged the industry to get behind the movement started by Union Electric Co and insist that air conditioning manufacturers improve power factor of units to at least 90%.

Metering . . . In reporting on developments in metering, representatives of Sangamo Electric Co, Westinghouse, General Electric, and Duncan Electric Manufacturing Co, stressed the new socket-type, general purpose meters of 15-amp rating with capability and high accuracy to 100 amp. Accuracies are also good from the very low ranges and up to the 100 amp loading.

J. H. Patton, Sangamo, reported that power companies are showing more interest in five-digit meters, reflecting load growths, trend toward bi-monthly and quarterly billing.

A 200-amp, socket-type meter which soon will be available was discussed by A. L. Carvill, GE. The meter will have a 48-kw demand feature and a recommended ten-year service period.

The 100-amp rated service is a reasonable minimum to install today, possibly by mandatory requirements, declared F. E. Davis, Anchor Manufactiuring Co vice president. He said anything smaller likely would prove to the industry and its customers.

Higher Secondary Voltage . . . Utilities should give serious thought to possible benefits to them of higher secondary voltage in distribution systems of downtown commercial areas, said R. F. Lawrence, Westinghouse.

The industry will not be able to make the complete change to the 240/480 secondary voltages, said D. K. Blake, GE, declaring it just isn't in the cards.

Switching . . . Silicones are being used for lubrication and protection against dirt and corrosion at friction points in power switches, said R. D. Cleaves, Line Material Co. Cleaves also showed how the use of silicone rings at certain points on the switches helped to break ice formations when switches were operated.

A combination pneumatic-hydraulic mechanism for the operation of circuit breakers was described by A. K. Hamer, Allis-Chalmers. The mechanism is designed for faster reclosing speeds and is sealed from dust and moisture.

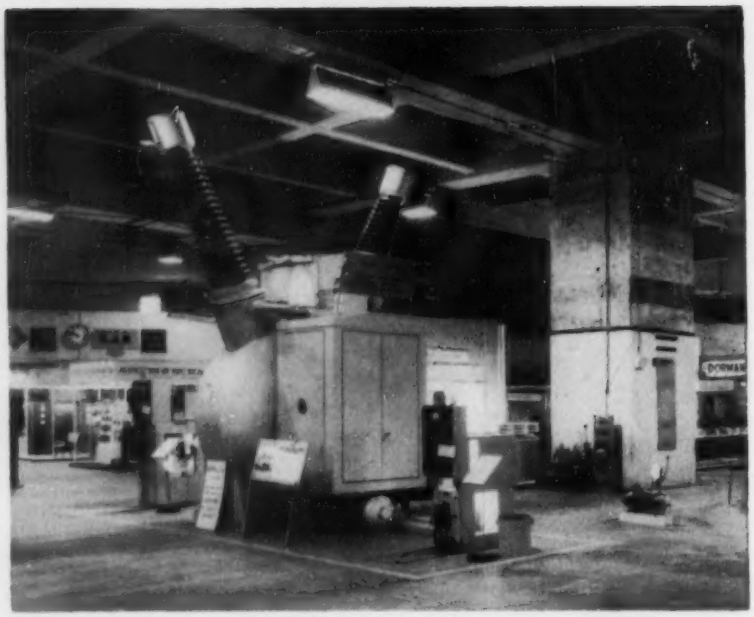
Accident Prevention . . . Transformers should be installed with the secondaries and not the primaries next to the poles, D. E. Wimberly, Arkansas-Missouri Power Co, told the accident prevention meeting. Earl Kimmel, of the same company, declared that numerous hazards exist in the operation of banked secondaries, the chief one being feed-back through transformers.

Counter shock may be used in the future to restore heart action following accidental electrical shock, re-

ported Dr W. B. Kowenhoven, dean of engineering, Johns Hopkins University.

Distribution . . . Several improvements were made in underground system design as part of Southwestern Gas & Electric Co's splitting of its network system, E. J. Best told the underground group. These included reshaping and enlarging manholes, installation of a pulling ring in the floor of the manhole, improved ventilation of vaults, installation of secondary capacitors and improvements in fire proofing of cables.

Coordination of fuses and breakers on 12-kv systems requires comprehensive study on the ac calculating board, said J. P. Barron, Dallas Power & Light Co. He described a system of coordination which, he said, restores service on 75% to 85% of faults without fuse replacement.



Power Equipment Exhibited by British

Power equipment like circuit breaker pictured above were among the exhibits at third Electrical Engineers' Exhibition, Earls Court, London.

Main purpose of the exhibition, organized by the Association of Supervising Electrical Engineers, was to show the progress made by the industry to the electrical engineers, manufacturers, and the public. There were 178 exhibits at this year's show compared with only 69 last year.

Fault Locator Tests

All-electronic equipment performs successfully on energized 220-kv line in second field trial

Location of a fault on an energized 220-kv line by inductive pick-up was accomplished successfully in the second field test of an all-electronic fault locator (EW, March 29, p 30). In a series of four staged faults on a 142-mile, double-circuit line, the equipment located the fault to the test tower twice. In another test the device spotted the fault within 500 ft of the tower. One test was inconclusive since the locator equipment was not reset following the previous fault.

Conducted on PG&E Line . . . Tests were conducted on Pacific Gas & Electric Co's No. 1 Pit line from Cottonwood to Vaca-Dixon substations. The test tower was located at Cortina Substation, about 55 circuit-miles from Vaca-Dixon. At the time of the tests, the line was carrying a normal Sunday morning load of 120,000 kw.

These tests differed from previous tests on the Los Angeles Department of Water Power system in one significant manner. For the PG&E tests the locator equipment was connected to one circuit on a double-circuit tower line and the fault was applied to the other circuit. In addition, Pit No. 1 line, consisting of 500,000-cir mils, rope-lay copper conductor, has a higher noise level than the Department of Water & Power test line.

Nevertheless, the current induced in the non-faulted line from the short-circuit of about 2,600 amp was sufficient to actuate the locator equipment. Otherwise, the test set-up and the testing procedure were similar to the tests in Los Angeles.

Comments on Test . . . G. H. Kalb of Risco, which designed the locator, commented on the failure to reset the equipment for the second test. In actual use there would be a connection from the fault locator to the breaker relay contacts, he said. If a breaker tripped simultaneously with an indication of a fault on the locator, the equipment would hold its readings. The locator would reset automatically and continue to monitor the line if there were no breaker operation.

Channel Link Practicable, Cable Sea Trials Indicate

Experimental lengths of electric power cable laid for short distances under the English Channel were damaged in four places after five weeks' immersion, the Institution of Electrical Engineers was told this month in London. The cable had been successfully energized at 300-400 kv, dc.

This cable was laid at the end of July, as part of the sea trials of the projected high-voltage link between the systems of British Electricity Authority and Electricite de France.

The institution heard three engineers representing the two systems state that investigations showed that suitable cables could be manufactured and installed for the cross-Channel power link. Breakdowns after installation and the practicability of effecting quick and satisfactory repairs, they said, were the only doubtful factors.

Recent findings, they said, removed doubts as to the practicability of the two systems operating continuously together through a 100-Mw interconnection. However, they stressed that prudence favored an initial installation of the minimum capacity consistent with reliable operation and an increase of capacity when service experience proved its feasibility.

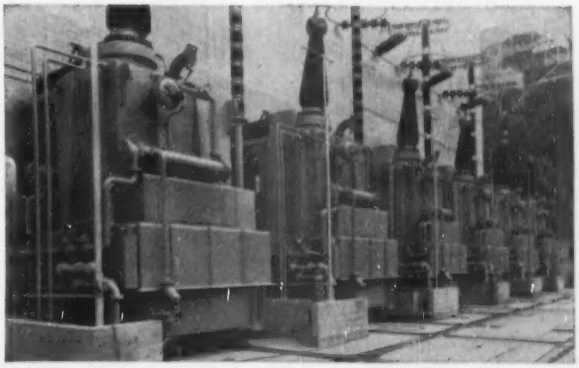
WHERE is this 230 kv Pennsylvania Transformer going?

The snow and tall fir trees in the background of the top photograph are two substantial clues that this transformer is headed for the Great Northwest. Further study of the picture will reveal that the transformer is *traveling in an upright position* and is *completely assembled* except for bushings and forced-cooling equipment.

When a large power transformer arrives at its installation site in this manner, ordinary rigging methods can be used to move the transformer from the drop center railway car to the foundation pad. Time and money will be saved in this operation — especially in remote places where special or heavy rigging equipment is not readily available.

Furthermore, the problem of putting a transformer into service is greatly simplified when it arrives at its destination completely assembled and in a one-piece tank. That was how the six transformers in these two 87,000 Kva banks reached the Great Northwest.

Prior to shipment, the covers were welded shut and the units gas-filled to keep the interiors of the transformers dry for their trip across the country. When the bushings, heat exchangers, and accessories were assembled, the transformers were ready for operation.



Contour-design, shell-form power transformers, such as these 230 Kv, 29,000 Kva units, can be designed and built by Pennsylvania in sizes up to 300,000 Kva and in voltages up to 330 Kv.

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division • **CANONSBURG, PENNSYLVANIA** • *Greater Pittsburgh District*

Supervisors 'talk it over' at . . .

Arizona Public Service Co

Under America's democratic system of government, problems and difficulties are usually best solved by discussion. That's why supervisors at Arizona Public Service Co are holding a series of conferences titled, "Let's Talk It Over!"

And they are "talking it over" as shown in the above picture. Line foreman, production supervisors, office personnel, are all sitting down in small, informal groups and having real old-fashioned cracker-barrel sessions.

Socialism, Communism, Democracy . . . They're talking about the differences between socialism, communism, and democracy. They're discussing the advantages and disadvantages of these forms of government. They're discussing the threat that communism poses to the world—the effects that communism and socialism have had on our American way of life—and what the American people can do to combat these forces of evil.

Public Service supervisors don't feel that they are solving world problems in this manner, but they are confident that they are awakening themselves to the meanings and dangers of communism and the ever-present threat of socialism.

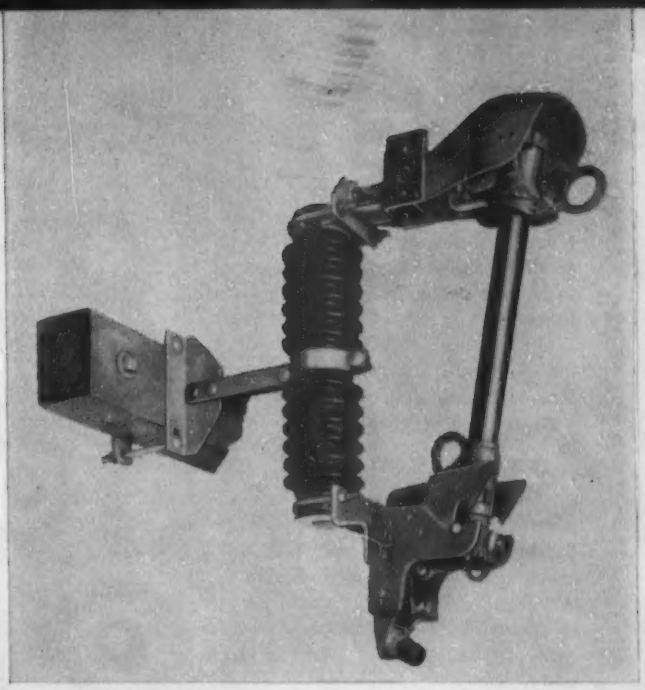
Commenting on the program, William Ismay, personnel manager, said: "I consider this the most important step the company has ever taken to improve the knowledge of our supervisors on world conditions, and to bolster their faith in the American economic system. We know from their comments that our supervisors consider the conferences worthwhile.

"From the very beginning," Ismay declared, "Americans have found that problems are best solved by sitting down and talking things over, arriving at a definite conclusion and then taking appropriate action. That's one of the reasons why we felt that this series of conferences would prove valuable, not only to our supervisors, but to the company and the community as well."

The program was originated by the Stanolind Oil & Gas Co, Tulsa, Okla., in conjunction with the University of Tulsa. It is given in four two-hour sessions to groups of 15 persons. Each group has a discussion leader. These leaders are trained in advance by the company's personnel department in the proper administration of the conferences.

Women Want To Talk Too . . . The womenfolk are coming in for their share of "talking" also. After the conferences had run for several weeks, women employees expressed a desire to sit down together and "talk over" the problems of socialism and communism. The company quickly made plans to conduct conferences for them.

Since Phoenix is the company headquarters, its greatest concentration of supervisory personnel is centered there, and most of the "Let's Talk It Over" conferences have taken place in Phoenix. However, in order to include all supervisors, discussion leaders from the personnel department are taking the program to other parts of the company's service area. More than 500 employees will participate.



NEW POWER FUSE

for Crossarm Mounting

is especially designed for use on distribution feeders where faults exceed the safe interrupting capacity of cutouts

The available short-circuit current at many of today's distribution transformers and distribution feeder sectionalizing points has ruled out cutouts as safe and reliable protective devices. At these current levels only the power fuse can assure positive, smooth circuit interruption. Only the power fuse blows without objectionable and hazardous expulsion by-products. Here is a power fuse to fit installation requirements—S&C's Type HSO on a single insulator.

The Type HSO Fuse is, of course, also available on NEMA insulators in single-, two-, and three-shot styles. In these styles the HSO has had a long and successful history in protecting power transformers and distribution feeders.

Complete information on S&C Type HSO Power Fuses and their applications is contained in this new Catalog Section 250 . . . we will gladly send you a copy.

S&C ELECTRIC COMPANY

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POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Specialists in High-Voltage Circuit Interruption

WSPC Bid Rejected

(*Continued from page* 15)

Tudor added that Interior would consider any commission request for a specific amount of dump power to prime up any steam plant it may plan to build, but said he knew of no such plans.

On the question of WSPC qualifying as a preference customer, Tudor said he had no doubts, personally, of such a status even though the Washington commission would wholesale rather than retail energy. He noted a similar arrangement exists in Arizona where that state takes energy from Parker, Davis, and Hoover Dams at busbar and wheels it over Reclamation Bureau lines to distribution agencies from Phoenix to Tucson. But the legal aspects were still under study, Tudor reported.

Utility, 2 Cities, 2 PUD's Form Puget Power Pool

Two municipalities, two PUD's and a private power company, meeting at Seattle, Wash., have agreed to pool their planning for future power developments, in what is known as the Puget Sound Power Pool. Individually, they have been studying hydroelectric projects capable of developing more than 3 million kw.

Groups involved are Tacoma City Light, Seattle City Light, Puget Sound Power & Light Co, Snohomish County PUD, and Chelan County PUD.

Arrangement does not involve pooling of facilities nor ownership, nor does it affect the utilities' membership in the Northwest Power Pool, participants emphasized. Initial move will be selection of "competent engineering assistance" to make load-growth and other studies, said Bob Jones, chairman of the utilities committee of the Seattle City Council.

Puget Sound P&L and Chelan PUD each have proposed dams on the Columbia River above Wenatchee. Puget Sound P&L has asked FPC for permission to investigate the Wells site, with a potential of 600,000 kw, while the Chelan PUD is seeking Congressional authorization to build a 910,000-kw project at Rocky Reach, in partnership with the federal government. Puget Sound P&L also proposes further development of the Baker and White Rivers in western Washington, adding about 150,000 kw, while the Chelan PUD is considering smaller projects on the Chiwawa and Wenatchee Rivers.

Seattle City Light would like to build a 600,000-kw dam on the Pend Oreille River at the Boundary site, and also is considering an 80,000-kw project at Copper Creek on the Skagit River. It definitely has scheduled installation of a fourth 90,000-kw generator in its Rose powerhouse and a 45,000-kw Gorge diversion dam, and is studying an addition to the height of Rose Dam.

Tacoma City Light long has sought to build a 435,000-kw development on the Cowlitz River and also is considering a diversion dam on the Skokomish River, to add to the generation of its Cushman plant.

The Snohomish PUD has studied a 60,000-kw project on the Sultan River.

Speeding Car Snaps Utility Pole

This utility pole in Pomona, Calif., was snapped in two when a car plowed into it at a speed estimated at 70 mph. One person was killed in the crash.

Other NW Developments

● Their application for formation of a joint operating agency having been tabled by Washington State Power Commission, PUD's of the state have begun organizing a Washington municipal power system. Cowlitz, Grays Harbor, Douglas, and Mason County PUD's have been authorized to join.

● Perturbed by what it called "splintering activities" around the region, Northwest Public Power Association has drawn up a rough draft proposal for a regional corporation to develop Columbia basin hydroelectric resources. The plan, to be offered to Congress next session, is similar to the St. Lawrence Seaway Development Corporation bill, now pending. Under this bill, a regional corporation could get its money from the U. S. Treasury at cost of money to the government.

Kuhlman Distribution Transformers help supply electric power for modern living standards

Kuhlman Distribution Transformers, specifically engineered for dependable, low-cost service, help utilities provide a steady and reliable source of power to American homes. Under operating conditions of varying loads these units give exceptionally good voltage regulation. The bent iron core construction permits full utilization of the best qualities of transformer steel and requires very little reactive power from a distribution system.

Insulation of Kuhlman Transformers is coordinated with the basic impulse level. Wide oil ducts insure ample cooling. Construction throughout is sturdy and rigid. Careful finishing of the sealed copper bearing steel tanks insures long service under the most difficult weather conditions.

Kuhlman Distribution Transformers are built by highly experienced electrical technicians, many of whom have been on the job at Kuhlman for fifteen to twenty years. Kuhlman Distribution Transformers are produced in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202, and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

152-M

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

Planned Lighting Awards

Standing, Harry Restofski, chairman EEI Prize Awards Committee; E. G. Barry, Arkansas Power & Light Co; C. T. Sinnott, New Orleans Public Service, Inc; Carter Lewis, Union Electric Co of Missouri; S. L. Drumm, chairman, Better Light-Better Sight Bureau; seated, D. Boots, Dayton Power & Light Co; E. H. Gardiner, Jr, Texas Power & Light Co; J. F. Morton, New Orleans PS

Here Are the Winners . . .

of awards for sales achievement in 1953, presented at Edison Electric Institute Annual Sales Conference, April 5-8

Thomas W. Martin Rural Electrification Award

Bud Moss, Georgia Power Co; E. A. Wilson, Alabama Power Co, representing the donor

Frank Watts Awards for Rural Service Achievement

M. O. Whited, Atlantic City Electric Co; E. O. Smith, Dayton Power & Light Co; H. M. Gibbs, Texas Power & Light Co, Elliott Odell, representing the donor, "Farm Journal"

Laura McCall Awards for Home Service Accomplishment

Mrs Amy Thompson, Florida Power Corp; Miss Ethel F. Lord, Jersey Central Power & Light Co; Miss Evelyn Hansen, Utah Power & Light Co; Miss Ruth Shank, Union Electric Co of Missouri; Miss Maurine A. Parker, Ohio Power Co; Mrs Mildred A. Lessenich, Wisconsin Electric Power Co; Mrs. Elizabeth Sweeney Herbert, representing the donor

George A. Hughes Awards for Appliance Promotion

George A. Weatherton, Kentucky & West Virginia Power Co, and E. E. Gayman, Cleveland Electric Illuminating Co, electric range promotion; R. W Butts, Ohio Edison Co, commercial electric cooking; C. W. Ailstock, Florida Power Corp, electric water heaters; L. C. Roe, Atlantic City Electric Co, commercial electric cooking; J. A. Bell, Hotpoint, Inc, representing the donor

George Westinghouse Awards for Home Laundry Promotion

Ralph Layfield, Georgia Power Co, automatic washers (another winner in this field, Cincinnati Gas & Electric Co, does not appear in the picture); E. M. Cobb, Ohio Power Co, and E. E. Gayman, Cleveland Electric Illuminating Co, electric clothes dryers; John J. Anderson, Westinghouse Electric Corp, representing the donor

"More Power to America" Awards

D. B. McGregor, Arizona Public Service Co; J. F. Gaskill, Philadelphia Electric Co; K. H. Runkle, General Electric Co, representing the donor

Chassis of Tabet Photoelectric Control for street lighting, showing operating mechanism. **1**, photocell. **2**, amplifier tubes. **3**, filament transformer. **4**, power switching relay (underneath, not shown) which handles up to two 15,000 lumen lamps or a large number of auxiliary relays. **5**, pilot relay to control power switching relay. **6**, protective fuse.

Dependable Tabet Photocell Assures Positive Control of Street Lighting

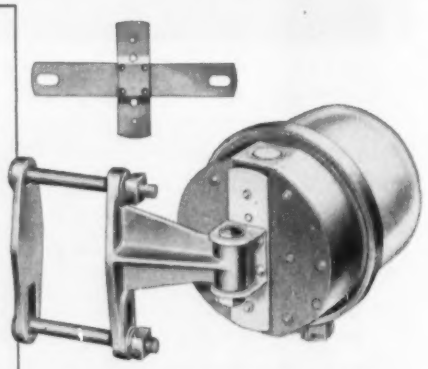
The Tabet Photoelectric Control is a rugged, delayed-action relay that turns street lights on shortly after sunset and turns them off again shortly before sunrise. It provides positive assurance of having the lights go on when the foot candle level of daylight drops to a predetermined point.

A light-sensitive photocell and amplifier operate a power switching relay of high capacity and versatile design. Time delay mechanism prevents false operation that might be caused by momentary incidental light changes, such as lightning or passing car lights.

Sensitivity is variable from ½ to 6 foot candles. Standard setting turns the lights on about 20 minutes after sunset and turns them off about 20 minutes before sunrise. Operation at increasing light levels is delayed 10 seconds, and at decreasing levels 2 seconds, to prevent undesired operation.

Features of Tabet Controls

- Suitable for the control of either series or multiple systems.
- Positive Fail-Safe operation; if unit should fail, lights go on, or stay on.
- Tabet Model PR Photoelectric Controls are designed to operate pilot circuits either energized in daytime or energized at night. Thus series circuits, multiple circuits, or pilot wire normally energized or normally de-energized, can be controlled with one type photoelectric unit.
- Relay contacts rated at 3000 watts, handle two 15,000 lumen lamps or equivalent, or inrush currents up to 192 amperes.
- Highest quality ceramic and paper condensers.
- Delayed action; no false operation caused by transient light changes.
- Easy installation; entire unit plugs into weatherproof watt-hour meter socket.
- Simplified procurement and stocking; one control meets all requirements.



Mounting is simple. The meter socket may be mounted directly to the pole, or may be attached to the pole or crossarm by means of an inexpensive pole band. A swivel type bracket is also available for crossarm mounting, allowing orientation of the relay with the northern sky.

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Get Complete Information on Tabet Controls

Ask the L-M Field Engineer for details on the Tabet Photoelectric Control, or write Line Material Company, Street Lighting Div., Milwaukee 1, Wis., (a McGraw Electric Company Division).

LINE MATERIAL

Street Lighting

Dean L. Potter

"Milwaukee Avenue has become the 'bright spot' of South Milwaukee with the installation of L-M's Uni-Ballast mercury vapor street lighting system," writes Mayor Dean L. Potter. "We are happy to report substantial savings in both installation and operation, and complete satisfaction with the system."

This system was put into operation July 2, 1952. Numerous other cities have since adopted this L-M-developed system because of its efficiency and economy.

L-M "Uni-Ballast" Lighting System A Proved Success Since 1952

Uni-Ballast is the series street lighting system for directly connected mercury vapor lamps. It eliminates individual ballasts; saves up to $90 per pole in labor and materials. Proved successful by numerous installations since 1952.

by **STACY STANDLEY**
Manager Lighting Sales
Line Material Company

Since July, 1952, when the first L-M Uni-Ballast system was put into operation, there has been a steady growth in interest in this revolutionary improvement in street lighting. Not only have more and more cities and utilities installed the system, but a number who have installed one system have ordered additional systems.

The L-M Uni-Ballast system offers marked economies. It eliminates individual ballasts, because 25 or more 400-watt mercury vapor lamps are operated in series on one Arctroller, L-M's static type regulator. These lamps would require a 25-kw regulator on a conventional series system.

The 25 lamps require only a single control station. Construction is simplified and more economical.

The Uni-Ballast system gives excellent cold-weather starting, because sufficient voltage is available to strike the lamp arcs. The maximum output voltage is limited by the saturation characteristics of the output transformer in the actual Arctroller circuit. When the Arctroller is connected to a mercury vapor lamp load, the voltage rises only to the value at which the lamp arcs strike. The Arctroller regulates faster than a moving coil regulator; surges are reduced to a minimum.

The system includes a voltage-sensitive time-delay relay, which prevents re-energization after outage until the lamps have cooled to the re-striking point. This protects lamp electrodes from unnecessary deterioration, minimizes bulb blackening, and assures greater lamp efficiency and maintains more uniform light levels. No half load starters required.

Power factor of the Arctroller is 94% to 100% between ½ and full load operation. This high power factor, and elimination of individual ballasts, saves about 12% in energy used.

"Uni-Ballast" and "Arctroller" are trademarks of Line Material Company.

Some Uni-Ballast Systems Now In Operation Or Being Installed

Collinsville, Ala.
Lodi, Calif.
Emporia, Kan.
Oxford, Kan.
Boonville, Mo.
Elsberry, Mo.
Warrenton, Mo.
Broken Bow, Neb.
Sylvania Plant, Batavia, N. Y.
Galion, Ohio
Cleveland, Okla.
Chamberlain, S. D.
Lexington, Tenn.
Nashville, Tenn.
Ripley, Tenn.
Rockwood, Tenn.
Houston, Texas
Lockhart, Texas
South Milwaukee, Wis.
Sun Prairie, Wis.
Thermopolis, Wyo.

Get the Whole Story on This L-M-Developed System

For complete information on the L-M Uni-Ballast system, ask the L-M Field Engineer to discuss it with you; or write Street Lighting Division, Line Material Company, Milwaukee 1, Wis. (a McGraw Electric Company Division).

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LINE MATERIAL *Street Lighting*

Compare your savings with these Kaiser Aluminum conductors:

	Per 1000 Ft. Lbs.	Cost
#6 Solid Copper TBWP*	112	$ 46.73
#4 Solid Alum PE (2/64)	48	26.50
#4 Solid Alum Neo (3/64)	64	26.50
#2 7 Strand Copper TBWP*	270	111.70
1/0 7 Strand Alum PE (4/64)	141	69.60
1/0 7 Strand Alum Neo (4/64)	172	69.60
2/0 7 Strand Copper TBWP*	522	204.99
4/0 7 Strand Alum PE (4/64)	261	136.00
4/0 7 Strand Alum Neo (4/64)	306	136.00
4/0 7 Strand Copper TBWP*	800	312.56
336400 CM, 19 Str. Alum PE (4/64)	388	213.00
336400 CM, 18 Str. Alum Neo (5/64)	469	228.00

Mar. 17, 1954 prices based on 30,000#—F.O.B. Destination
*URC Copper Triple Braid Weatherproof

WHY PAY over $.02 for five inches of conductor you never get?

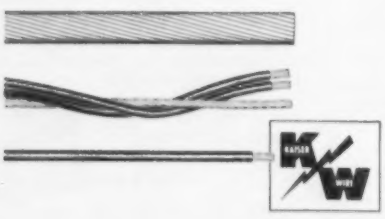
Why not *get* that missing five inches by specifying Kaiser Aluminum conductor instead of copper! When you do:

(1) You can string far *more line* for the same amount of money, or

(2) You can string the same amount of line for far *less money!*

Remember . . . *all* types of Kaiser Aluminum covered conductor give you big savings over covered copper conductor of equivalent current-carrying capacity. These savings add up to thousands of dollars a year!

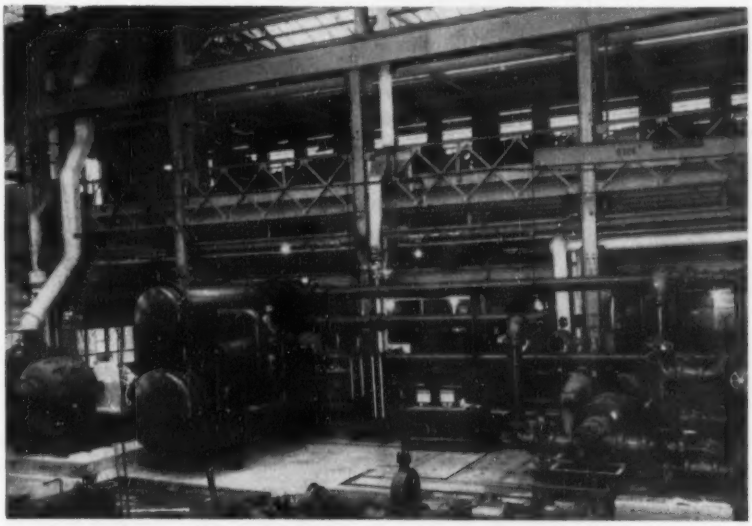
Let Kaiser Aluminum help you convert to aluminum easily, efficiently, economically—as hundreds of power companies are doing! Complete field, engineering, and laboratory services available at no obligation. Contact any Kaiser Aluminum office in principal cities, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Office*, Kaiser Bldg., Oakland 12, Calif.



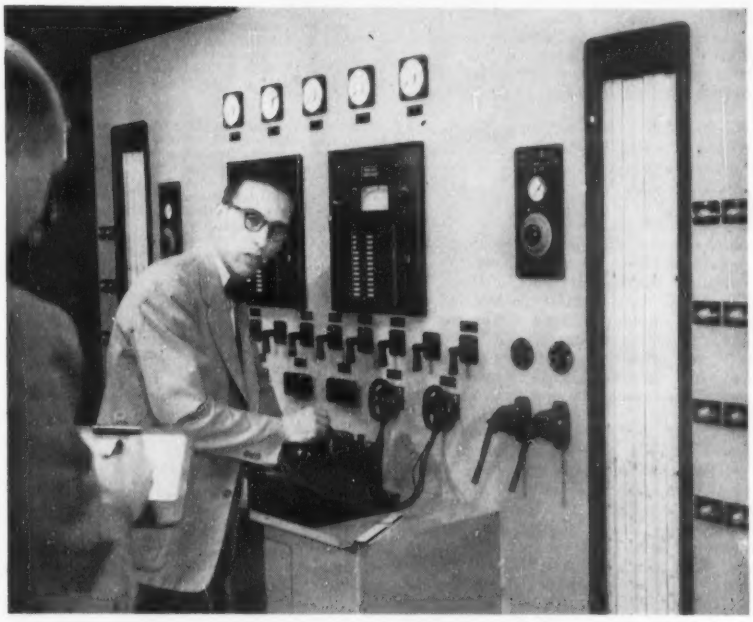
Kaiser Aluminum

setting the pace—in growth, quality and service

MANUFACTURERS AND MARKETS



Centrifugal Compressor Put Through Paces . . .



. . . by Technicians at Worthington's New Lab

Worthington Corp's new hydraulic test laboratory is being used to test pumps ranging from small fractional horsepower units to capacities in excess of 100,000 GPM. Centrifugal compressor (shown at top), destined for Trans-Arabian Pipeline Station, recently was tested in the new lab under guidance of central control board pictured above.

The new laboratory, which covers 20,000 sq ft in the firm's Harrison, N. J., plant, includes several areas: (1) Standard Set Up devoted to small capacity pumps not exceeding 2,000 GPM. (2) Large and Special Test Set Up can handle pumps in excess of 100,000 GPM. This area has 250 psi and 700 psi steam lines for turbine drive. (3) High Speed Test area has two double extended Worthington steam turbines for driver service, each serviced by 700 psi steam.

British Order A-Factory Furnaces from GE, Ltd

LONDON—(McGraw-Hill World News)—Details have been released in London recently by the General Electric Company, Ltd, London, England, of a $1,400,000 (£500,000) order from the British Ministry of Supply for furnaces and furnace pots for use in the production of purified uranium metal.

The order, which comprises 54 electric vertical cylinder furnaces, each rated at 100 kilowatts, and 200 furnace pots, is believed to be the largest ever placed at one time in any part of the world.

The furnaces, which are in use at the Springfields factory of the Atomic Energy Authority at Salwick, near Preston in Lancashire are used in the final stage of the production of the uranium metal.

To Invest $3.5 Million

British Insulated Callenders Cables Ltd, London, has announced plans to invest another $3.5 million in its Canadian subsidiary, Phillips Electrical Co, Ltd, headquarters in Brockville, Ontario.

The British firm recently won the contract for manufacture of B. C. Electric Co's $5 million submarine cable from Vancouver to Vancouver Island, B. C.

Phillips Electrical's cable plant is in Montreal. At Brockville is its wire factory and rolling mill.

MANUFACTURING BRIEFS

As part of its long range expansion program, **National Vulcanized Fibre Co,** Wilmington, Del., has announced plans for a modern research laboratory to enlarge the facilities of the company's research and development section. The laboratory will be housed in a warehouse at Yorklyn, Del., which will be renovated at an estimated cost of almost $500,000. It will contain 20,000 sq ft of floor space.

Electric appliances sales of Westinghouse Electric Corp were up 5% in January and February of this year

according to John Ashbaugh, vice president of the Electric Appliance Division. Ashbaugh said sales of Westinghouse appliances during 1954 are expected to be 15% greater than sales in 1953, the division's best year.

U. S. output of aluminum surpassed copper for the first time last year and is now second only to steel in the metal field, according to the United Business Service. The Service has forecast that domestic aluminum production this year will show a gain of nearly 20% over 1953.

Line Material Co, Milwaukee, Wis., has chosen the new name L-M PERMA-LINE Conduit for its bituminous fibre conduit. The company has applied for registration of the PERMA-LINE trademark. The conduit was known in the electrical trade for over 25 years as L-M Fibre Conduit.

General Electric Co has been awarded a contract for installation of a 66,000-kw generator in the William C. Dale power station, Ford, Ky., of East Kentucky Rural Electric Co-operative Corp. Unit is slated to go into operation by October, 1957.

SALES ASSIGNMENTS

COMPANY STAFFS

Anaconda Wire & Cable Co, New York, has made the following district sales office appointments: Jack Saunders was named manager of a new sales district including all of Florida. Robert W. Carmichael will work with Saunders in the new office which will be located in Tampa. Frank D. Dickey was appointed manager of the San Francisco district to succeed Lee Hayward, who has resigned. Dickey will be assisted by Dick Riley, who was transferred from the Cincinnati district. Howard Davies was assigned as salesman in the Pittsburgh office and Thomas F. Jackson to the Chicago office.

Line Material Co, Milwaukee, has assigned William E. Bracey, apparatus engineer operating out of the Dallas office of the Southwest Division, to the post of Central Division manager with headquarters in Kansas City. Floyd M. McKenna, a field engineer in the Southwest Division since 1949, will replace Bracey in Dallas.

Philco Corp, Philadelphia, has named James T. McMurphy as Texas Division manager with headquarters in Dallas. McMurphy, electronic representative for Philco in its Capital Division in Washington, D. C., replaces John J. Goldschmeding, Jr, new refrigerator sales manager for the Appliance Division. Alfred O. Tepper, appliance representative in the Capital Division, now will be responsible for Philco's activities in that division in both the electronic and appliance fields.

Graybar Electric Co has appointed W. G. Trometter manager of its newly opened New Brunswick, N. J., branch office, which is located at 2762 Livingston Avenue. With the company since 1937, Trometter has been a salesman in the Newark, N. J., branch since 1945.

General Electric Co's Carboloy Department has assigned Robert M. Pozzo as sales representative in its Atlantic district headquarters at Newark, N. J. Joseph C. Betts has been named a sales representative with Detroit as his headquarters. He will contact accounts in Michigan and Ohio.

Dravo Corp, Pittsburgh, has appointed Arthur W. Culliver to its New York office staff as application engineer to handle the sale of fabricated piping. Before joining Dravo, he was sales engineer for Walsh-Holyoke Fabricators, Inc.

Westinghouse Electric Co has named Walter T. Baker, Pacific Coast district appliance manager since 1951, to the position of Pacific Coast regional manager of major appliances. From his headquarters in San Francisco, Baker will direct sales, merchandising and distribution of major appliances from Denver, Colo., to the Hawaiian Islands. Harold E. Hugo, Pacific Coast district sales promotion manager for appliances, was made regional sales promotion manager. R. Fred MacGillivray, appliances specialties representative, was appointed district manager of major appliances for northern California and Nevada.

Dravo Corp's new West Coast office at San Francisco will be managed by William A. Walton, who has been with the firm since 1940. Frank S. Trumbower, who started with Dravo in 1942, will work as territorial sales and service manager for the office, which is located at 681 Market St. Dravo also moved its Atlanta, Ga., office to 1401 Peachtree St., N. E. Wheeler M. Bearden, formerly of the Pittsburgh office, will join the staff of the Atlanta office, which is under the supervision of William W. Timmis, Jr.

MANUFACTURERS' EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Anaconda Wire & Cable	12	Dec.	$6,015,386	$6,275,922	$7.13	$7.44
A. B. Chance	12	Dec.	340,238	....	....	....
Corning Glass Works	12	Dec.	12,681,395	10,323,156(b)	4.66	3.77
Pyrene Manufacturing	12	Dec.	11,753(a)	258,062	....	....

Notes—(a) Excluding special credits amounting to $2,173,392; (b) Exclusive of $2,009,759 profit after taxes from sale of 90,000 shares of common stock of Owens-Corning Fiberglas Corp.

MEETINGS CALENDAR

A. & M. College of Texas
7th Annual Conference for Protective Relay Engineers, Department of Electrical Engineering, College Station, Tex., April 26-28.

National Association of Electric Companies
Annual Meeting, Mayflower Hotel, Washington, D. C., April 29.

Edison Electric Institute
Prime Movers Committee, Electrical Equipment Committee and EEI-AEIC Meter and Service Committees, May 3-4; Hydraulic Power and Transmission-Distribution Committees, May 4-5, All at Edgewater Beach Hotel, Chicago; 22nd Annual Convention, Atlantic City, N. J., June 1-4; Accident Prevention Committee, Mark Hopkins Hotel, San Francisco, July 1-3.

American Public Power Association
Annual Meeting, Hotel Morrison, Chicago, May 4-6.

***American Institute of Electrical Engineers**
Northeastern District Meeting, Hotel Van Curler, Schenectady, N. Y., May 5-7; Appliance Technical Conference, Subcommittee on Domestic Appliances of Committee on Domestic-Commercial Applications, Morrison Hotel, Chicago, May 17-19; Fourth Welding Conference in cooperation with American Welding Society, Hotel Schroeder, Milwaukee, May 19-21; Conference on Telemetering, Morrison Hotel, Chicago, May 24-26; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25; Committee on Petroleum, Conference on Electrical Applications in Petroleum Industry, Mayo Hotel, Tulsa, Okla., Sept. 27-29; Middle Eastern District Meeting, Abraham Lincoln Hotel, Reading, Pa., Oct. 5-7; Fall General Meeting, Morrison Hotel, Chicago, Oct. 11-15.

***Pennsylvania Electric Association**
Joint Spring Meeting of Relay Committee and Systems Operation Committee, Bedford Springs Hotel, Bedford, Pa., May 6-7; System Planning Committee, Hotel Hershey, Hershey, Pa., May 10-11; Industrial Sales Conference, sponsored by Industrial Committee, Skytop Lodge, Skytop Pa., May 13-14; Transmission and Distribution Committee, Fort Bedford Inn, Bedford, Pa., May 13-14; Prime Movers Committee, Castleton Hotel, New Castle, Pa., May 17-18; Communications Committee, Penn-Harris Hotel, Harrisburg, Pa., May 20-21; Electrical Equipment Committee, Lord Baltimore Hotel, Baltimore, Md., May 24-25.

Southeastern Electric Exchange
Spring Meeting, Engineering and Operation Section, Sans Souci Hotel, Miami Beach, Fla., May 6-7.

Northwest Electric Light & Power Association
Business Development Section, Hotel Boise, Boise, Idaho, May 10-12; Accounting and Business Practice Section, Davenport Hotel, Spokane, Wash., May 20-21; Personnel Section with EEI Industrial Relations Committee, Multonah Hotel, Portland, Ore., July 12-14.

Public Utilities Advertising Association
National Convention, Hotel Statler, Boston, May 13-14.

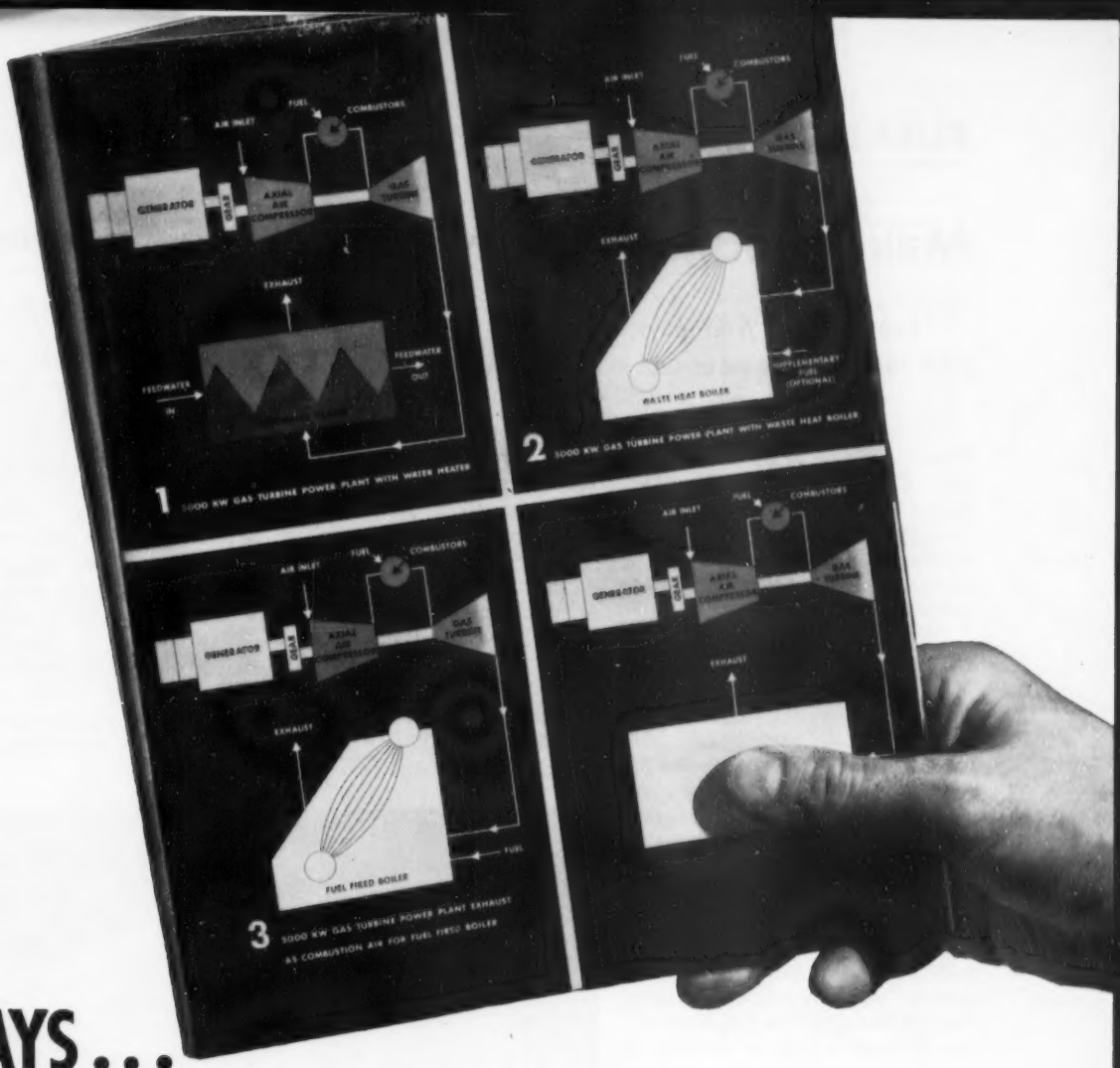
Pacific Coast Electrical Association
Annual Convention, Hotel Del Coronado, Coronado, Calif., May 19-21.

National Association of Electrical Distributors
Annual Convention, Atlantic City, N. J., June 6-11; Pacific Zone Convention, Mark Hopkins Hotel, San Francisco, Oct. 4-7.

American Society of Mechanical Engineers
Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24; Fall Meeting, Schroeder Hotel, Milwaukee, Wis., Sept. 8-10.

Nuclear Engineering Conference
Sponsored by American Institute of Chemical Engineers, University of Michigan, Ann Arbor, Mich., June 20-26.

*Addition this week.



3 WAYS...

to put new life into older steam stations!

Westinghouse gas turbine power plants give you 3 different ways to immediately add capacity and improve heat rate . . . helping to solve the problem of obsolete steam conditions and derated equipment.

In addition to producing dependable electric power, the gas turbine exhausts approximately 73,000,000 Btu's per hour—much of which can be efficiently utilized for—

- **Feedwater Heating** . . . to take load off steam plant and permit running steam turbine at full capacity.
- **Waste Heat Boiler** . . . to generate steam for low pressure turbines, with supplementary fuel firing if desired.
- **Combustion Air** . . . using the exhaust, with its high oxygen content, as preheated combustion air for fuel-fired boilers.

Westinghouse engineers are ready to help you take full advantage of this low-cost extra capacity and flexibility. Their analysis of your plant will indicate whether a gas turbine power plant is the key to more profitable station operation. Ask your Westinghouse salesman or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-50569

• • •

Special Westinghouse features—such as "two-bearing design", split-case construction and packaged assembly—are described in a new book, *Westinghouse Gas Turbine Power Plants for Electric Power Generation.* Ask your Westinghouse salesman for B-5887.

YOU CAN BE SURE...IF IT'S

Westinghouse

Makes Judgment Payment

Pennsylvania W&P pays Con Gas of Baltimore $1,085,763 after failing to file an appeal in revenue suits

Following a decision by Judge Albert V. Bryan of the Federal District Court in Wilmington, Del., Pennsylvania Water & Power Co has made a payment of a $1,085,763 judgment plus $92,631 in interest to the Consolidated Gas, Electric Light & Power Co of Baltimore.

The verdict was rendered on Feb. 2, 1954. Following Pennsylvania W&P's decision not to appeal within a month, the payment was made.

PW&P's Counterclaim Disallowed . . . Judge Bryan also disallowed a counterclaim of Pennsylvania W&P against Con Gas for $534,000. The suits involved claims for revenues under a joint contract to supply power to the Pennsylvania Railroad Co.

Since Pennsylvania W&P has already paid taxes to the federal government, it will be entitled to receive a refund because of the judgment suit. This may run as high as $500,000, it has been estimated.

In the meantime, other litigation and hearings are pending between the two companies. The most important is a suit which Pennsylvania W&P has carried to the Supreme Court.

In this case, Pennsylvania W&P has claimed triple damages against Con Gas totaling more than $17 million. This is due to increased costs of construction since 1948 of a new steam generating plant at Holtwood, Pa., loss of earnings, and additional expenses.

Supreme Court Review Asked . . . A year ago the Federal District Court dismissed the suit, and in December, 1953, it was upheld by the U. S. Court of Appeals. Pennsylvania W&P has asked the Supreme Court to review the adverse decisions.

The Federal Court also denied Pennsylvania W&P's motions for summary judgment against Con Gas for about $3 million in bills in dispute because of alleged overcharges by Pennsylvania W&P.

The court referred the question to the Federal Power Commission which had claimed jurisdiction on the overcharge complaint. Hearings have been in progress for some time on the proper proportioning of these bills.

FPC also has before it the matter of determining rates on power generated by Pennsylvania W&P on a unit basis instead of on a residual basis, heretofore used under a voided contract between Con Gas and the Pennsylvania W&P.

FINANCIAL BRIEFS

Testifying before the Senate Finance Committee on a House-approved provision to put large corporations on a pay-as-you-go tax basis, Pennsylvania Power & Light Co's Pres Charles E. Oakes said "Electric companies accrue taxes on their books but as their tax payments are not made until the next year, the cash is used for working capital. The commissions that regulate us take this into account in establishing rate bases on which we can earn. They would, of course, have to increase the rate bases should this pay-as-you-go proposal go through." "This would mean somewhat higher rates for our customers," he pointed out to the committee.

Consumers Power 50,000th Stockholder

Miss Anna Van Til pictured above with her rare flowering Crown-of-Thorns plant in her Grand Rapids apartment, recently became Consumers Power Co's 50,000th holder of common stock. She will be honored guest this week at the company's regional share owners' meeting in Grand Rapids. Like Miss Van Til, two-thirds of all Consumers' owners have less than 100 shares.

Gulf Power Co is planning to sell $10 million first mortgage bonds, competively on June 22, to refund $6,593,000 first mortgage 4⅛% bonds.

Boston Edison Co has asked the Massachusetts Department of Public Utilities to approve billing customers on a bi-monthly basis, effective May 1.

Oregon Public Utilities Commission has permitted the merger of Pacific Power & Light Co and Mountain States Power Co . . . **Portland General Electric Co's** stockholders have approved a two-for-one stock split . . . **Whatcom County PUD** is receiving bids at Bellingham, Wash., until May 13 for $650,000 in revenue bonds.

Madrid, Spain, Supreme Court has rejected Barcelona Light & Traction Co's appeal to void the auction of the company's shares held at Reus (Catalonia) in January 1952. The decision of the Supreme Court kills Barcelona L&P's last hope to get back control of holdings in Spain.

Excise Tax Cut May Drop Consumers Price Index

The new reduction in excise tax may bring a comparatively sharp drop in the government's cost-of-living indicator—if retailers and manufacturers do not hike prices on the tax-eased items.

The Bureau of Labor Statistic's Consumers Price Index contains 14 items affected by the tax relief, making up nearly 7% of the total weight in the housewives monthly market basket purchases. Should prices remain exactly the same, the index for April (released late in May) would fall by about one half of one point. This would be the largest overall change in the past six months.

These are the retail items affected by the tax cut which are incorporated in the index: Fur coats, handbags, face creams, face powder, permanent wave refill, movies, telephone, and railroad fares. Movies alone account for 1.32 of the consumer's market basket spending, and with all the retail these items make up 3.22% of the index.

The manufacturers' items are: Water heaters, refrigerators, cookstoves, toasters, electric light bulbs, and sporting goods. Their total index weight is 3.56%.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1954									
April 15	**2.84**	**2.88**	**3.15**	**3.93**	**4.09**	**4.43**	**4.76**	**5.13**	**5.36**
Apr 8	2.84	2.87	3.14	3.92	4.08	4.42	4.79	5.15	5.38
END OF QTR.									
1st 1954	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10

Date: Reis & Chandler, Inc.

EARNINGS

Company	Period Months	Ended	Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
El Paso Electric	12	Feb.	$1,751,209	$1,576,109	$2.20	$1.97
Long Island Lighting	12	Mar.	8,169,001	6,636,851	1.29(a)	1.27(a)
			1953	**1952**	**1953**	**1952**
Carolina Power & Light	12	Dec.	$7,319,255	$7,160,609	3.00(b)	3.09(b)
Central Illinois Public Service	12	Dec.	5,860,840	5,351,150	1.44(c)	1.51(c)
Community Public Service	12	Dec.	1,316,984	1,219,326	1.60(f)	1.48(f)
Georgia Power	12	Dec.	12,527,174	12,093,607	....	....
Interstate Power	12	Dec.	2,432,787	2,390,841	.91	.89
Iowa Electric Light & Power	12	Dec.	2,855,679	2,529,539	1.62(i)	1.42(i)
Lake Superior District Power	12	Dec.	1,007,311	940,127	2.80(f)	2.93(f)
Michigan Gas & Electric	12	Dec.	470,000	466,000	2.83(g)	2.80(g)
New Jersey Power & Light	12	Dec.	1,436,728	1,337,084	....	....
Pennsylvania Electric	12	Dec.	10,456,553	8,177,529	....	....
Southwestern Gas & Electric	12	Dec.	4,228,270	3,826,744	....	....
Tampa Electric	12	Dec.	2,554,060	2,262,895	3.55	3.25
Western Massachusetts	12	Dec.	2,815,460(j)	2,236,543(j)	2.55(h)	2.29(h)

Notes—Figures shown for the last thirteen companies have been audited; (a) Based on average number of shares outstanding; (b) Based on 2,047,500 shares in 1953 and 1,950,000 shares in 1952; (c) Based upon the number of shares outstanding at the end of each year (f) Based on 306,110 shares in 1953 and 267,849 shares in 1952; (g) Based on 140,039 shares; (h) Based on 1,106,160 shares in 1953 and 978,527 shares in 1952; (i) Based on 1,544,304 shares; and (j) After adjustment for hydro equalization.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF APRIL 15–21			
Bonds			
Department of Water & Power of City of Los Angeles, Calif., electric revenues due 1955-84	$15,000	various	0.85–2.70%
West Penn Power—1st mtg 3% due 1984	12,000	100.50%	2.975
Preferred Stock			
Northern States Power (Minn.)—150,000 sh $4.08 $100 par	$15,000	$102.00	4.00%
Arkansas Power & Light—70,000 sh 4.32% $100 par	7,000	101.647	4.25
Common Stock			
Florida Public Utilities—25,000 sh	$225	$9.00	6.67%
SCHEDULE FOR APRIL—MAY			
Bonds and Debentures			**Bid Date**
Commonwealth Edison—1st mtg due 1984	$50,000	.....	April 27
Utah Power & Light—1st mtg due 1984	15,000	.....	April 28
Delaware Power & Light—1st mtg due 1984	10,000	.....	May 3
Montana Power—1st mtg due 1984	6,000	.....	May 4
Wisconsin Electric Power—1st mtg due 1984	20,000	.....	May 4
Cleveland Electric Illuminating—1st mtg due 1989	20,000	.....	May 4
Consolidated Edison Co of N. Y.—1st mtg due 1984	50,000	.....	May 10
Montana Power—debs due 1979	18,000	.....	May 11
Virginia Electric & Power—1st mtg due 1984	25,000	.....	May 12
Pacific Gas & Electric—1st mtg due 1984	65,000	.....	May 17
Public Service Electric & Gas—1st mtg due 1984	50,000	.....	May 18
New York State Electric & Gas—1st mtg due 1984	20,000	.....	May 19
California Electric Power—1st mtg due 1984	8,000	.....	May 25
Iowa Public Service—1st mtg due 1984	7,500	.....	May 26
Preferred Stock			
Montana Power—60,000 sh no par	$6,000	.....	May 4
Empire District Electric—40,000 sh $100 par	4,000	.....	.....(a)
Niagara Mohawk Power—210,000 sh $100 par	21,000	.....	May 11(b)
California Electric Power—105,000 sh $50 par	5,250	.....	May 19(c)
Public Service Electric & Gas—249,942 sh $100 par	24,994	.....	.....
Common Stock			
Housatonic Public Service—41,159 sh (to be offered commonholders on 1-for-8 basis, record April 23)	.....	.....	.....
Wisconsin Electric Power—421,492 sh (to be offered commonholders on 1-for-10 basis, record about April 28)	.....	.....	.....
General Public Utilities—606,423 sh (to be offered commonholders on a 1-for-15 basis, record May 12 to expire June 2)	.....	.....	.....

Notes—(a) First Boston Corp, underwriters; (b) Harriman, Ripley & Co, underwriters; and (c) Merrill Lynch, Pierce, Fenner & Beane, underwriters.

NSP Wins Power Battle

Wisconsin PSC orders Northern States Power instead of Vernon Electric Co-op to furnish energy to television station

Wisconsin Public Service Commission agreed in a recent order to allow Northern States Power Co instead of a competing electric co-operative to provide service at a higher rate to a local television station.

The PSC in its findings stated that the company on Dec. 9, 1953, notified "the commission and the Vernon Electric Cooperative, Westby, . . . of the company's intention to extend the company's electric distribution system about 3,900 feet to serve WKBH Television, Inc., La Crosse, located . . . in the town of Bergen, Vernon County, near La Crosse."

Co-op Files Objection . . . "On Dec. 15 the Vernon Electric Cooperative by its attorneys filed objection to the proposed extension on the ground that the cooperative is prepared to accept the station as a member and render required service and that the extension by the company would result in needless duplication of facilities."

The findings continued:

"The Vernon Electric Cooperative also has electric distribution lines in the town of Bergen and has had them since it started operations about 1937. The general area south of La Crosse is served from a sub-station of the Dairyland Power Cooperative immediately east of Stoddard. Single-phase service since November, 1953, has been provided at the television transmitter site, but it appears that the station is not a member of the cooperative. However, both in the letter of objection and in testimony at the hearing, the cooperative stated that it is prepared to accept the station as a member.

"The particular line which now serves the station is a single-phase 7.2-kv line about 2.9 miles long to the point where it connects to a 12.4-kv 3-phase line. From this point it is about 4 miles by line to the Stoddard substation. Initially the cooperative proposed to reconstruct the single-phase line to 3-phase to provide the station with service. However, later the objector arranged with the Dairyland Power Cooperative to tap the latter's 34.5-kv 3-phase line which extends a distance of 64 miles from Genoa to Independence and passes between 600 ft and 700 ft from the television station."

In its opinion, the PSC said:

"The tapping of a 34.5-kv transmission line to serve a single relatively small customer is a somewhat unorthodox procedure and in this case, with the transmission line the property of the Dairyland Power Cooperative, appears to be an expedient to permit the Vernon Electric Cooperative to provide reasonably adequate service which it could not do with its own facilities. It is further unusual as the distribution co-operative would own the short length of 34.5-kv line and transformer, whereas the power cooperative usually owns the substation and sells at the output of the substation."

No Customer Contribution . . . The opinion continued: "Based on initial estimated use, the annual charge by the cooperative would be about $2,052 and that by the company, $4,551."

The PSC concluded: "Under the circumstances, even though the television station at the present time can get more dependable service at lower rates and with less investment from the cooperative than from the public utility, WKBH Television is entitled to electric public-utility service when the station desires such service and when there is no showing of interference with the service or facilities of the two cooperatives in the area. There is no such showing in this case."

Bids Frequency Signal Change

Illinois Commerce Commission has ordered the Illinois Central Railroad Co to change the frequency of its signalling system because of Central Illinois Public Service Co operational interference.

The interim order of the commission stated that the railroad company filed a complaint to the effect that "the current from the power lines of respondent is wrongfully interfering with the complainant's automatic train-stop system between Champaign and Branch Junction, Ill., and praying that this commission require respondent to make such additions, extensions, repairs or improvements to, or changes in, its existing operations, plant, equipment, (etc.) [parenthesis supplied] . . . or to take such other steps as may be necessary to correct the interference with complainant's train stop system so as to promote the security or convenience of the public."

Denies Responsibility . . . In its findings, the ICC stated: "Respondent has filed its answer denying any and all responsibility or liability with respect to or arising out of the interference with the automatic train-stop system of the complainant and has prayed that the commission enter an order dismissing the complaint."

The commission continued ". . . the most practical way to avoid electrical interference with the proper operation of complainant's automatic train-stop system from the operation of respondent's power lines is for the Illinois Central to substitute for its present 60 cps automatic train-stop system a 100 cps automatic train-stop system."

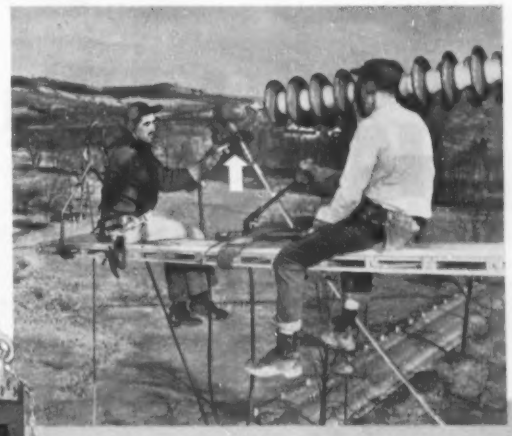
In reserving final jurisdiction of the case, the ICC concluded "that due to the complexities and technical aspects of the case, a final decision as to the respective rights and obligations of the parties may not be reached for a considerable length of time it reasonably follows that it is in the public interest that immediate steps be taken to correct the interference so as to eliminate the imminent and continuing hazard to the public and to complainant's employees."

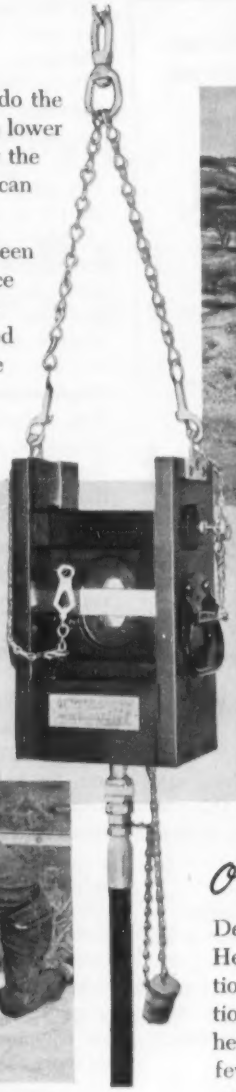
Now *ONE* portable tool makes transmission line splices

OVERHEAD

It's no longer necessary for linemen to do the sagging and marking overhead and then lower the line to the ground for splicing. Now the complete operation, including splicing, can be performed overhead.

T & B's Forty-Ton Hydraulic Head has been specially designed for heavy-duty service in building transmission lines. Since it weighs only 36 pounds, this factory-rigged tool can be put into operation anywhere a man can throw a rope. Safety chains keep all removable parts from falling to the ground.



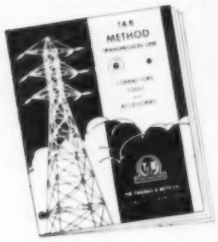


T&B's Forty-Ton Hydraulic Head, Cat. No. 21940, specially designed for transmission line building.

or ON THE GROUND

Demountable legs hold T & B's Forty-Ton Hydraulic Head at convenient working height when installations are being made on the ground. During operation, hardened steel dies compress fitting and cable hexagonally into one homogeneous mass . . . all in a few seconds. The same die set installs tension splicers, dead ends, loop splicers and taps, tees and terminals.

Modern hydraulic design has virtually eliminated the need for maintenance. However, field maintenance is simple and practical. The 21940 Installing Head can be completely disassembled and reassembled in less than one-half hour with these common tools: screw driver, Allen wrench, and mallet.



T&B Bulletin 70 gives a detailed description of the Forty-Ton Hydraulic Head as well as complete lines of T&B connectors, tools, and accessories for transmission line building. Send for FREE copy.

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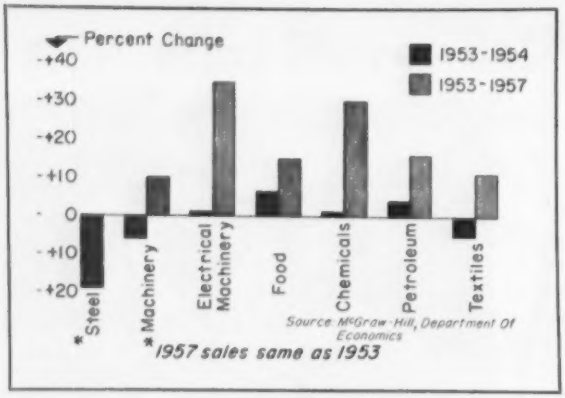
ELECTRICAL BUSINESS OUTLOOK



Companies Expect to Increase Sales

Manufacturing companies expect to boost their sales by 12% between 1953 and 1957. That's one of the key findings of the seventh annual McGraw-Hill survey of Business' Plans for New Plants and Equipment. (EW, April 19, p 102).

Electric utilities can expect more big gains in power sales if these manufacturers' expectations come true. The companies that expect the biggest growth in sales are in fields tied directly to the electric power industry.

Industry's sales expectations are not entirely optimistic, as the chart above shows. Many companies expect lower sales in 1954 than last year. And, if they are correct, that means a slowdown in the long-run growth trend for industrial electric power consumption. But even for 1954, most of the industries that expect to make the best records are those that use a lot of electric power.

Steel Companies' Sales May Show Largest Decline . . . Manufacturing companies reporting for the McGraw-Hill survey are classified in nine major industries, plus a catch-all group called "other manufacturing." Of these ten groups, companies in six expect sales to decline in 1954. Largest decline is expected by the steel companies.

But note the four industries that expect higher sales: Food companies expect the largest growth—7%. Chemical and oil companies expect smaller gains. And all three industries are among the major consumers of electric power.

Electrical machinery is the other industry in which companies expect higher sales this year. In this case, it's a product—electrical appliances—rather than the industry's consumption of electric power, that is most important for the average utility. Another key power-consuming industry not shown on the chart—paper—expects sales to go up 3% in 1954.

For the longer run—1953-1957—the picture is pretty much the same. By and large, it is companies in the key power-consuming industries that expect the largest growth in sales. Electric machinery companies expect to gain most—35%. Chemical companies are close behind, with an expected rise in sales of 30%.

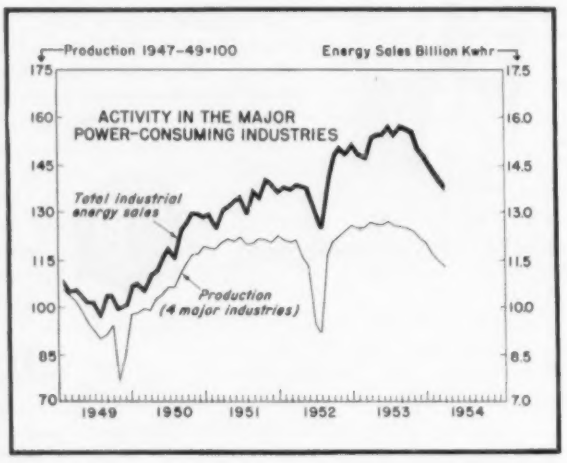
Not all power consumers think they will increase sales sharply in the next four years. Steel companies expect to sell about as much in 1957 as in 1953—not a bad prospect considering that 1953 was such a tremendous year for steel. Transportation equipment companies (including aircraft, but excluding automobiles) think their sales will actually decline by 20%, as defense spending tapers off.

Expectations—Not Forecasts . . . It's important to note that, although this is a report of what companies expect to happen, it's not necessarily a forecast. Companies make their own assumptions about what the general economic situation will be in 1957. If it's not as good as they think it's going to be, then their sales won't grow so fast either.

Furthermore, these are reports of the expectations of individual manufacturing firms—not expectations for their industries. Most companies expect to grow much faster than their industries will grow.

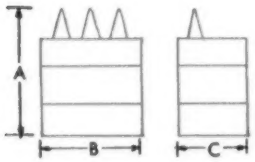
As a group, manufacturers think industry sales will increase by only 4% between 1953 and 1957—as opposed to an average of 12% growth for their own firms. But, in general, the industries that are expected to have the greatest sales growth are also key industries for the electric utilities.

Indications that manufacturing companies are planning to compete harder and grow faster than their competition is significant in itself. Competition will require cost cutting, among other things. Companies report that they are planning to devote more and more of their capital spending to modernizing or replacing older and less efficient plants and equipment. The chances are that modern plants will use more electric power per unit of output.



THE A B C'S OF TRANSFORMER MANUFACTURE

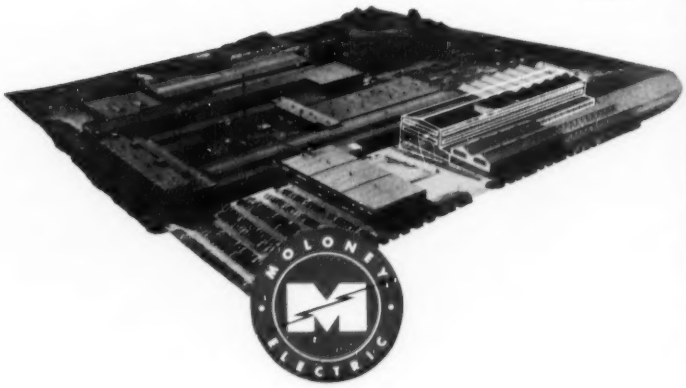
The three dimensions for transformers in the blueprint stage, as shown in diagram, are A, B, and C, the physical measurements of a product. This product would be of little value to today's utility without the coefficient A, B, C of knowledge, facilities, and experience as basic elements of the manufacturer.

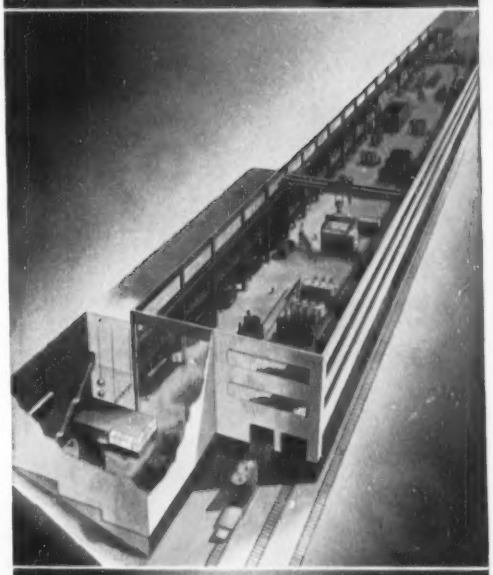


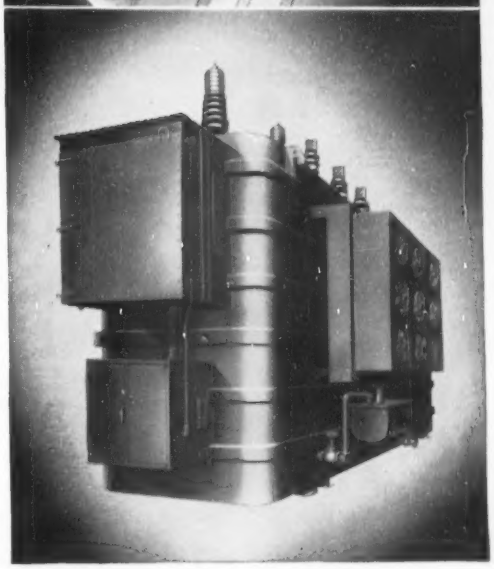
The A B C's of transformer manufacture are the combined result of utility demands and manufacturing know-how. Needs expertly calculated by the utilities have made mandatory the possession by manufacturers of A, a high level of knowledge; B, wide facilities; and C, depth of experience.

Moloney is fully qualified in the A, B, C's of transformer manufacture. Since 1896 it has been building and expanding its facilities, its knowledge and its experience to parallel, and to anticipate, utility needs. Now, once again, another long step forward has been taken in increasing facilities here at Moloney so that we can continue to produce transformers capable of superior operation in the high ratings so necessary to today's utility.

ME54-4







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5/8% STEP VOLTAGE REGULATORS

MECHANISM both field and laboratory tested . . . will withstand five million operations.

CONTACTS designed for long life, made of arc-resisting materials of generous size.

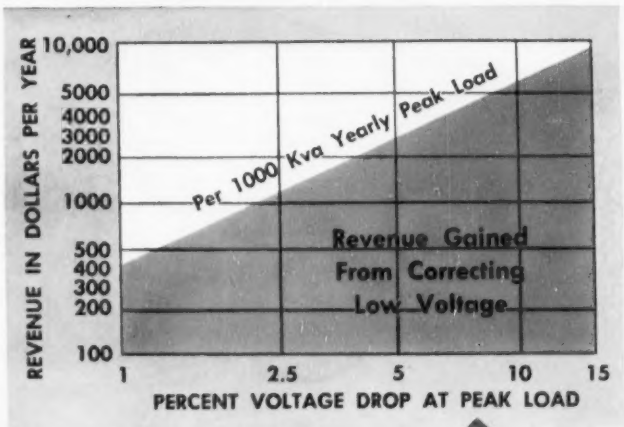
UNIT CONSTRUCTION assures top quality workmanship — all connections made before tanking.

MAINTENANCE is simplified. Control, for example, is easy to adjust, simple to remove and replace.

You can improve the profit picture on almost any feeder with Allis-Chalmers distribution regulators. The chart at right shows how controlled voltage can increase revenue. The cost is low. Most users find they pay back their cost in less than two years.

Installation is easy. Mount your A-C distribution regulators on a pole near the load or put them on simple foundations right next to substation transformers.

It will pay you to get the complete facts. Call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wis.



Assuming: 90% Power Factor; 40% Load Factor; 50% Lighting Load; Energy Charge: 3¢/kwhr; Average Lighting Load Drop — 70% of Peak Load Drop; You can interpolate directly for other loads.

A 4183

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